

IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF VIRGINIA  
Norfolk Division

CENTRIPETAL NETWORKS, INC.,

Plaintiff,

v.

CISCO SYSTEMS, INC.,

Defendant.

CIVIL ACTION NO.  
2:18cv94

**\* \* CONFIDENTIAL INFORMATION REDACTED \* \***

TRANSCRIPT OF VIDEOCONFERENCE BENCH TRIAL PROCEEDINGS

Norfolk, Virginia

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BEFORE: THE HONORABLE HENRY COKE MORGAN, JR.  
United States District Judge

APPEARANCES:

KRAMER LEVIN NAFTALIS & FRANKEL LLP  
By: James R. Hannah  
Counsel for the Plaintiff

DUANE MORRIS LLP  
By: Matthew C. Gaudet  
Counsel for the Defendant

## I N D E X

PLAINTIFF'S  
WITNESSPAGE

MICHAEL MITZENMACHER, PH.D.	
Direct Examination By Mr. Hannah (Resumed)	571

## E X H I B I T S

PLAINTIFF'S  
NO.PAGE

PTX-1911	570
PTX-1912	570
PTX-1913	570
PTX-1914	571
PTX-1263	577
PTX-1315	578
PTX-1294	579
PTX-1385	588
PTX-1348	590
PTX-1849, Page 185	595
PTX-1195	597
PTX-1915	606
PTX-1920	609
PTX-1916	618
PTX-1917	627
PTX-1849, Page 236	640
PTX-1849, Page 29	640
PTX-244	643
PTX-1277	644
PTX-1291	650
PTX-1289	654

1	(The proceedings commenced at 10:05 a.m.)	09:43:21
2	THE CLERK: Civil Action Number 2:18cv94,	10:05:37
3	Centripetal Networks, Inc. v. Cisco Systems, Inc.	10:05:42
4	For the plaintiff, Mr. Hannah, are you ready to	10:05:45
5	proceed?	10:05:48
6	MR. HANNAH: Yes, Your Honor.	10:05:49
7	THE CLERK: For the defendant, Mr. Gaudet, are you	10:05:50
8	ready to proceed?	10:05:53
9	MR. GAUDET: Yes, we are.	10:05:53
10	THE COURT: All right. Let's continue with the	10:05:58
11	direct examination.	10:06:04
12	MR. HANNAH: Your Honor, just a couple of	10:06:10
13	housekeeping matters. We would like to introduce the	10:06:12
14	deposition slides. We've marked them with PTX numbers, as we	10:06:15
15	discussed yesterday. We have supplied the Court with a	10:06:20
16	binder, also, with the deposition slides and the appropriate	10:06:24
17	marking.	10:06:31
18	THE COURT: All right.	10:06:32
19	MR. HANNAH: And so for the deposition of Petr	10:06:33
20	Cernohorsky, this is on December 4, 2019, this is Page 48,	10:06:39
21	line 21, through Page 49, line 16. It has been labeled	10:06:43
22	PTX-1911, and we would like to move that into evidence, Your	10:06:51
23	Honor.	10:06:55
24	THE COURT: Just a second. Let me find that.	10:06:55
25	(There was a pause in the proceedings.)	10:06:55

1	THE COURT: All right. That's PTX what?	10:07:22
2	MR. HANNAH: 1911.	10:07:24
3	THE COURT: PTX-1911. Okay.	10:07:28
4	(Plaintiff's Exhibit PTX-1911 was received in	10:07:39
5	evidence.)	10:07:40
6	MR. HANNAH: The next clip was Peter Jones. This	10:07:40
7	was his November 26, 2019 deposition. The page number was	10:07:44
8	Page 30, line 23, through 31, line 20. And we have marked	10:07:51
9	that as PTX-1912, and we would like to move that into	10:07:58
10	evidence, as well.	10:08:03
11	THE COURT: All right.	10:08:07
12	(Plaintiff's Exhibit PTX-1912 was received in	10:08:10
13	evidence.)	10:08:11
14	MR. HANNAH: The next deposition clip and the slide	10:08:11
15	was also Peter Jones. That was his November 26, 2019	10:08:14
16	deposition. This is Page 27, line 12, through 28, line 2.	10:08:18
17	We have labeled this as PTX-1913, and we would like to move	10:08:25
18	this into evidence.	10:08:30
19	THE COURT: All right.	10:08:32
20	(Plaintiff's Exhibit PTX-1913 was received in	10:08:33
21	evidence.)	10:08:35
22	MR. HANNAH: The last that was introduced yesterday	10:08:35
23	was the deposition testimony and slide of Martin Hughes.	10:08:38
24	This was his December 17, 2019 deposition. It spanned from	10:08:45
25	Page 40, line 9 through line 19. We have marked this as	10:08:50

~~Mitzenmacher, M. - Direct~~

1 PTX-1914, and we would like to move that into evidence, as  
2 well, Your Honor.

3 THE COURT: All right. That will be admitted.  
4 (Plaintiff's Exhibit PTX-1914 was received in  
5 evidence.)

6 MR. HANNAH: Thank you, Your Honor.  
7 If it may please the Court, may I proceed?

8 THE COURT: You may.

9 MR. HANNAH: Thank you, Your Honor.

10 MICHAEL MITZENMACHER, PH.D., called by the  
11 Plaintiff, having been previously duly sworn, was examined  
12 and testified further as follows:

13 DIRECT EXAMINATION (Resumed)

14 BY MR. HANNAH:

15 Q. Doctor, let's just bring up the summary of your opinions  
16 for the '806 patent.

17 And can you remind the Court, what are your opinions  
18 with regard to the '806 patent?

19 A. My opinions for the '806 patent are that claims 9 and 17  
20 are infringed by the sets of products you see on the left.

21 So that would be the Catalyst switches in combination with  
22 the Digital Network Architecture, the Aggregation Services  
23 Routers in combination with the Digital Network Architecture,  
24 the Integrated Services Routers in conjunction with the  
25 Digital Network Architecture. And then a separate set of

~~Mitzenmacher, M. - Direct~~

1 products would be the Firepower and Adaptive Security 10:10:07  
2 Appliance products, together with the Firepower Management 10:10:11  
3 Center. 10:10:14

4 MR. HANNAH: And, Your Honor, just as a reminder, 10:10:16  
5 the plan is to run through the '806 patent, both claims 9 and 10:10:18  
6 17 at the same time, with the Catalyst switches and the two 10:10:25  
7 sets of routers, and then we'll run through the claims again 10:10:29  
8 with the Firepower firewalls. 10:10:33

9 THE COURT: All right. 10:10:37

10 BY MR. HANNAH: 10:10:38

11 Q. So, Doctor, let's turn to JTX-2. 10:10:39

12 Is this the -- 10:10:47

13 MR. HANNAH: And this has already been admitted, 10:10:48  
14 Your Honor. 10:10:50

15 BY MR. HANNAH: 10:10:50

16 Q. Is this the '806 patent on which you provide your 10:10:51  
17 opinions? 10:10:54

18 A. Yes. 10:10:54

19 Q. Sir, can you tell the Court, looking at your 10:10:55  
20 demonstrative, what does the '806 patent generally cover? 10:11:00

21 A. So the '806 patent covers a specific sort of method or 10:11:06  
22 methodology for doing what we call a rule swap. So the idea 10:11:13  
23 is that you have a set of rules, but then there's going to be 10:11:18  
24 changes, and so while you're doing the changes, you want to 10:11:21  
25 do it efficiently and effectively in various ways. So, as 10:11:26

~~Mitzenmacher, M. - Direct~~

1 part of that, there's discussion about sort of preprocessing  
2 an optimization in the claims, and the other is doing an  
3 appropriate swap, as described in the claims.

4 And one of the outcomes of the way the claims  
5 describe how to do this rule set swap is that it avoids the  
6 dropping of packets during this intermediate time when you  
7 have to swap the rule set.

8 Q. For purposes of your analysis, we'll begin with the  
9 Catalyst routers, the Catalyst switches, the Aggregated  
10 Services Routers, and the Integrated Services Routers.

11 For purposes of infringement, do they operate in the  
12 same way?

13 A. Yes, they operate in the same way with regard to this.

14 Q. And is that similar to like yesterday in that they  
15 contain the same operating system?

16 A. They contain the same operating system, and they use  
17 similar codes for those operations.

18 Q. So if we turn to the claims of the '806 patent, we see  
19 that there's claim 9 on the left and then claim 17 on the  
20 right.

21 Do you see that, Doctor?

22 A. Yes.

23 Q. Can you explain to the Court, what is the difference  
24 between the two claims in this first set of elements?

25 A. In the first set of elements, it's very similar to what

~~Mitzenmacher, M. - Direct~~

1 we saw before. One -- claim 9 is a system claim, discussing 10:12:55  
2 a system, comprising processors and memory. The other is a 10:13:00  
3 computer-readable media claim which would correspond to this, 10:13:04  
4 to the instructions. 10:13:10

5 Here, for the system and the computer-readable 10:13:12  
6 media, we'll be discussing sort of both the actual, or the 10:13:17  
7 system, the switches and routers -- the switches and routers 10:13:24  
8 and the Digital Network Architecture that controls them. 10:13:25

9 Q. And yesterday we saw several documents and had a 10:13:29  
10 discussion about whether the Catalyst switches, the ASR and 10:13:33  
11 the ISR, the routers, whether they were a system, whether 10:13:39  
12 they had a priority of processors, and whether they had 10:13:43  
13 memory comprising instructions that, when executed, caused 10:13:47  
14 the processors to perform certain tasks. 10:13:50

15 Do the same documents that we looked at yesterday -- 10:13:56  
16 would they equally apply to this claim today? 10:13:59

17 A. Yes, they would for those, because, again, that's simply 10:14:01  
18 discussing the processors and the memory. 10:14:06

19 Q. And then turning to claim 17, it has the one or more 10:14:08  
20 non-transitory computer-readable media comprising 10:14:14  
21 instructions. Would the same documents that we applied 10:14:18  
22 yesterday apply to this claim today for the switches and the 10:14:21  
23 routers? 10:14:25

24 A. Yes, they would. 10:14:25

25 Q. All right. So rather than going back through those 10:14:26



~~Mitzenmacher, M. - Direct~~

1	documents, is it fair to say that the Catalyst switches and	10:14:29
2	routers and the ASR and ISR routers meet this claim element	10:14:33
3	for the same reasons that you discussed yesterday?	10:14:39
4	A. Yes, they do.	10:14:40
5	Q. Is it okay if we check that box?	10:14:42
6	A. Sure.	10:14:45
7	Q. Okay. All right. Let's turn to the first element, which	10:14:46
8	is the -- or I should say the receive element, which is	10:14:53
9	receiving a first rule set and a second rule set.	10:14:57
10	Is this claim element identical between claim 9 and	10:14:59
11	claim 17?	10:15:03
12	A. Yes, it is.	10:15:04
13	Q. So can we take these at the same time?	10:15:05
14	A. Yes.	10:15:07
15	Q. Can you explain to the Court how the Catalyst switches	10:15:08
16	and the ASR and ISR routers receive a first rule set and a	10:15:13
17	second rule set?	10:15:18
18	A. Sure. So, essentially, it receives them -- kind of	10:15:19
19	receives them in various ways, but one of the ways we'll be	10:15:25
20	talking about here is through the Digital Network	10:15:30
21	Architecture. So the Digital Network Architecture is what	10:15:33
22	passes down in sort of the command center for the routers and	10:15:38
23	the switches and can be used to pass or to send out the rule	10:15:41
24	sets to the routers and switches. So you can think that the	10:15:45
25	rules come into the Digital Network Architecture center by	10:15:49

Mitzenmacher, M. - Direct

1 way of its various components And that these are -- it's then 10:15:54  
2 passed through to the various routers and switches through 10:16:01  
3 that center. 10:16:05

4 And the reason we talk about a first rule set and a 10:16:06  
5 second rule set is because these rules, as we've seen, they 10:16:09  
6 have to change. They're updated. They're dynamic. They 10:16:13  
7 have to respond to new threats. So you may start with a 10:16:17  
8 first rule set, but over time, that rule set is going to be 10:16:20  
9 updated or be fixed as the needs change. 10:16:27

10 Q. So if we turn to the next slide, which is a demonstrative 10:16:32  
11 showing the Digital Network Architecture, can you explain to 10:16:40  
12 the Court what's being shown here? 10:16:44

13 A. Right. So the Digital Network Architecture can receive 10:16:46  
14 information, various sorts of threat intelligence from 10:16:52  
15 various sources, which may cause it to say, I'm going to have 10:16:54  
16 to change or update the rules. 10:16:59

17 We've seen a bit of that, I think, when we talked 10:17:00  
18 about the previous patent; that, you know, there may be 10:17:01  
19 updated information, a security threat with regard to 10:17:08  
20 exfiltration, that you determine, I've got to change how the 10:17:11  
21 rules are functioning for some of the users. But this can 10:17:14  
22 come from, you know, information like Stealthwatch or threat 10:17:19  
23 intelligence from other -- through other sources, third 10:17:25  
24 parties, but also through Cisco itself. 10:17:28

25 Q. All right. I'd like to turn your attention to PTX-1263. 10:17:31

~~Mitzenmacher, M. - Direct~~

1 And if we blow up the last paragraph on that first page, how 10:17:44  
2 does this support your opinion as to whether the DNA center 10:17:51  
3 interacts with the switches and the routers? 10:17:56

4 A. Right. So as it says here, the routers and switches 10:17:59  
5 support the Cisco DNA, even now with the software updates, 10:18:03  
6 and using the DNA, the Digital Network Architecture, as we've 10:18:09  
7 shown, that's a way of managing, spreading new rules out to 10:18:15  
8 the entire system effectively and efficiently. 10:18:19

9 MR. HANNAH: Your Honor, we'd like to move PTX-1263 10:18:24  
10 into evidence, please. 10:18:27

11 MR. GAUDET: No objection. 10:18:29

12 THE COURT: PTX-1263 -- 10:18:29

13 MR. HANNAH: 1263, yes, Your Honor. 10:18:36

14 THE COURT: -- will be admitted. 10:18:38

15 (Plaintiff's Exhibit PTX-1263 was received in 10:18:39  
16 evidence.) 10:18:40

17 MR. HANNAH: Thank you, Your Honor. 10:18:40

18 BY MR. HANNAH: 10:18:41

19 Q. Doctor, I'd like to turn your attention to PTX-1315. 10:18:53

20 Can you explain to the Court what this document is? 10:19:03

21 A. This is another document describing the Digital Network 10:19:06  
22 Architecture system and software. 10:19:12

23 MR. HANNAH: We'd like to move PTX-1315 into 10:19:13  
24 evidence, please. 10:19:17

25 MR. GAUDET: No objection. 10:19:18

~~Mitzenmacher, M. - Direct~~

1	THE COURT: PTX-1315 will be admitted.	10:19:24
2	(Plaintiff's Exhibit PTX-1315 was received in	10:19:36
3	evidence.)	10:19:34
4	MR. HANNAH: Thank you, Your Honor.	10:19:34
5	BY MR. HANNAH:	10:19:38
6	Q. I'd like to turn your attention to Page 7 of this	10:19:45
7	document.	10:19:50
8	MR. HANNAH: And, Your Honor, this is ending in	10:19:50
9	corresponding Bates number 0007.	10:19:53
10	THE COURT: Right.	10:19:56
11	BY MR. HANNAH:	10:19:59
12	Q. Doctor, can you explain what's being shown here, in terms	10:20:00
13	of on this slide?	10:20:05
14	A. This is a high-level description of what Cisco's aiming	10:20:06
15	for with the Digital Network Architecture. In particular,	10:20:12
16	you can see that it is built-in security. And this notion	10:20:17
17	of, you know, business insights, they discuss this throughout	10:20:20
18	their documents; that this provides a way of having -- it	10:20:24
19	basically discusses things like you provide intents or	10:20:29
20	suggestions, and then the rules adapt as the network adapts.	10:20:33
21	So this will also lead to rule changes as new	10:20:36
22	elements enter or act as a threat to the security system.	10:20:42
23	You know, automated, again, that there's the sort of	10:20:47
24	automated drivers element to access the system, as well.	10:20:50
25	Q. All right. I'd like to turn your attention to PTX-1294.	10:20:58

~~Mitzenmacher, M. - Direct~~

1	Can you explain to the Court what this document is?	10:21:06
2	A. This is the data sheet describing the Digital Network	10:21:09
3	Architecture center. So, again, this would be an	10:21:15
4	outward-facing document that would be available to the public	10:21:18
5	or the customers.	10:21:21
6	MR. HANNAH: Your Honor, we'd like to move PTX-1294	10:21:24
7	into evidence.	10:21:27
8	MR. GAUDET: No objection.	10:21:32
9	THE COURT: That will be admitted.	10:21:38
10	(Plaintiff's Exhibit PTX-1294 was received in	10:21:38
11	evidence.)	10:21:38
12	MR. HANNAH: Thank you, Your Honor.	10:21:41
13	BY MR. HANNAH:	10:21:49
14	Q. I'd like to turn to Page 3 of this document.	10:21:49
15	MR. HANNAH: And, Your Honor, that is on	10:21:52
16	corresponding Bates number 0003.	10:21:54
17	BY MR. HANNAH:	10:21:54
18	Q. If we could look at the last paragraph, Doctor, can you	10:21:56
19	explain what this document is showing?	10:21:59
20	A. Right. So it mentions this is describing the platform,	10:22:02
21	and it says that, "An open and extensible platform allows	10:22:09
22	third-party applications and processes to exchange data and	10:22:14
23	intelligence with the Cisco DNA center. This improves IT	10:22:17
24	operations by automating workflow processes based on network	10:22:21
25	intelligence coming from the Cisco DNA center."	10:22:28

Mitzenmacher, M. - Direct

1           So, again, this is showing that the Digital Network 10:22:30  
2   Architecture center is receiving, obtaining, you know, 10:22:34  
3   various threat intelligence, and it can use that to provide 10:22:38  
4   new rules or to make changes into the underlying security 10:22:42  
5   rules used by the switches and routers. 10:22:47

6   Q. And can you explain how this is showing that the DNA 10:22:51  
7   center is receiving -- the DNA center with the switches and 10:22:56  
8   the routers is receiving a first and a second rule set? 10:22:59

9   A. So what this threat intelligence information -- right? -- 10:23:02  
10   is this is one of the ways that it gets new rules, right? So 10:23:07  
11   this threat information is typically given in a format. 10:23:10  
12   Sometimes it's referred to as observables. This would be, 10:23:15  
13   you know, problems or issues that have arisen, and they 10:23:18  
14   generally are also given with a corresponding action or a 10:23:25  
15   suggestion, like, here is something bad; you should block it. 10:23:29  
16   Or, here's something potentially dangerous; you should block 10:23:32  
17   it. Or, in some cases, the action may be simply to monitor 10:23:36  
18   it so that you can observe and see that it's something that 10:23:40  
19   may be a later cause for action. 10:23:44

20   Q. And as we saw in the previous documents and in this one, 10:23:47  
21   as well, does the DNA center provide security for the 10:23:51  
22   switches and the routers? 10:23:56

23   A. Yes. The DNA center will update the switches and routers 10:23:57  
24   with new rules, as needed. 10:24:04

25   Q. Doctor, I'd like to turn your attention to -- 10:24:08

~~Mitzenmacher, M. - Direct~~

1 THE COURT: Excuse me. 10:24:12

2 In your view, this language suggests that the rules 10:24:12  
3 continually change during the operation of the network? Is 10:24:24  
4 that what that language means to you? 10:24:32

5 THE WITNESS: So I'd say, yes, with maybe the caveat 10:24:34  
6 that "continually," you know, might be a bit of a stretch, 10:24:40  
7 simply because they'll get the new rules, they'll process 10:24:46  
8 those new rules, they'll decide when they need to have an 10:24:49  
9 update, and that will depend on the situation. So, you 10:24:54  
10 know -- 10:24:58

11 THE COURT: Well, when the patent says "one set of 10:24:58  
12 rules" and "two sets of rules" -- 10:25:01

13 THE WITNESS: Yes. 10:25:01

14 THE COURT: -- you interpret that as meaning three 10:25:07  
15 sets of rules, four sets of rules? 10:25:12

16 In other words, it continues to replace the rules as 10:25:14  
17 needed, not just one rule -- two sets. 10:25:17

18 THE WITNESS: Right. So I'm not sure what the right 10:25:26  
19 way to interpret is from the legal standpoint, since it calls 10:25:28  
20 for two sets of rules, but certainly in practical settings 10:25:34  
21 I'd imagine there would be further updates of rules; that I 10:25:40  
22 imagine it could be more than two, or you might expect 10:25:44  
23 additional rules in sequence, in the way that you're 10:25:48  
24 thinking, yes. 10:25:51

25 THE COURT: And this last reference, 1294, suggests 10:25:52

~~Mitzenmacher, M. - Direct~~

1 to you -- "continuous" is not a good word, but it will 10:25:59  
2 automatically replace the existing rules, when needed, based 10:26:08  
3 on the threat intelligence? 10:26:15

4 THE WITNESS: Yes. That's one of the things it 10:26:18  
5 does, yes. 10:26:20

6 THE COURT: And this language is what tells you 10:26:22  
7 that, this language here? 10:26:26

8 THE WITNESS: Yes. 10:26:28

9 THE COURT: Because the prior language didn't 10:26:29  
10 exactly say that. 10:26:32

11 THE WITNESS: I think we'll see other documents and 10:26:34  
12 other testimony that helps explain that, as well, but 10:26:35  
13 certainly this language is part of it, and I think we'll see 10:26:40  
14 more examples. 10:26:44

15 THE COURT: All right. 10:26:45

16 BY MR. HANNAH: 10:26:51

17 Q. Well, let's turn to PTX-992. And we previewed this 10:26:52  
18 yesterday when we were talking about the Cisco Stealthwatch 10:26:54  
19 which was integrated. 10:26:57

20 MR. HANNAH: And, Your Honor, this has already been 10:26:59  
21 admitted into evidence. We discussed this yesterday. 10:27:01

22 THE COURT: Right. 10:27:05

23 BY MR. HANNAH: 10:27:06

24 Q. If we go to the second page of this document under the 10:27:07  
25 "Predictive Threat Analytics," how it talks about that the 10:27:12



—Mitzenmacher, M. - Direct—

1 engine is using the Cisco Talos threat intelligence, can you 10:27:20  
2 explain, Doctor, how this informed your opinion as to whether 10:27:25  
3 the DNA center with the switches and the routers are 10:27:29  
4 receiving rules? 10:27:34

5 A. Right. So it's receiving updates from Stealthwatch, 10:27:34  
6 which is part of the Digital Network Architecture, and some 10:27:39  
7 of those updates can be based on -- 10:27:45

8 MR. GAUDET: Your Honor, I apologize. I have an 10:27:48  
9 objection to this, which is that Stealthwatch is not an 10:27:49  
10 accused product on this patent and was not identified as an 10:27:54  
11 accused product in the expert's report. It was certainly 10:27:58  
12 identified as an accused product on other patents, and 10:28:01  
13 clearly set forth in that way in the expert's report, but not 10:28:05  
14 on this patent. 10:28:08

15 MR. HANNAH: Your Honor, we showed yesterday in 10:28:18  
16 PTX-1281 that Cisco's Stealthwatch is integrated into the DNA 10:28:20  
17 center, and so that integration into the DNA center makes 10:28:25  
18 Stealthwatch relevant. 10:28:31

19 MR. GAUDET: Your Honor, if I could respond just 10:28:34  
20 briefly. 10:28:37

21 This is a matter of simple notice. They are two 10:28:37  
22 absolutely different products. You can buy one without the 10:28:41  
23 other. Most people do. And he never put us on notice that 10:28:43  
24 he was saying Stealthwatch was accused with respect to this 10:28:48  
25 patent. 10:28:53

~~Mitzenmacher, M. - Direct~~

1 THE COURT: Well, that's a matter of argument. I'll 10:28:55  
2 have to look at the documents to see if accusing DNA would be 10:28:58  
3 equivalent to accusing Stealthwatch. 10:29:08

4 MR. GAUDET: We just wanted to preserve the 10:29:12  
5 objection. We don't mean to sidetrack things any more than 10:29:14  
6 that, Your Honor. 10:29:18

7 THE COURT: Well, I think the point it raises is if 10:29:19  
8 they accuse the network DNA, did that incorporate 10:29:25  
9 Stealthwatch as being part of that, and that's a matter of 10:29:35  
10 argument that the Court will have to decide. I'll let the 10:29:42  
11 witness continue. 10:29:48

12 MR. HANNAH: Thank you, Your Honor. 10:29:50

13 THE WITNESS: Thanks. 10:29:50

14 And if I may just clarify on that point that was 10:29:52  
15 raised, I admit, I'd have to look back in my report for the 10:29:58  
16 wording. My recollection is that we discussed in my report, 10:30:02  
17 you know, the DNA architecture as a whole. 10:30:05

18 However, if we're simply talking about -- remember, 10:30:09  
19 here we're just talking about receiving rule sets, and even 10:30:13  
20 if Stealthwatch wasn't included, the DNA center receives rule 10:30:16  
21 sets, and this is simply showing where it receives it from. 10:30:23  
22 Like it wouldn't have to be accusing Stealthwatch in 10:30:26  
23 particular, because like the DNA center would receive this 10:30:30  
24 through -- you know, from Stealthwatch through the Talos 10:30:34  
25 threat intelligence. 10:30:39

Mitzenmacher, M. - Direct

1 But, as you can see here, the idea is that 10:30:41  
2 Stealthwatch uses the internal telemetry and the threat 10:30:44  
3 intelligence and uses this to send information to the DNA 10:30:54  
4 center, which receives these rules and rule sets. 10:30:59

5 THE COURT: Okay. 10:31:03

6 BY MR. HANNAH: 10:31:09

7 Q. All right. Doctor, if we turn back to the claims of the 10:31:10  
8 '806 patent, based on all of the information and documents 10:31:14  
9 that you reviewed, does the DNA center, with the switches and 10:31:19  
10 routers -- does it receive a first and second rule set? 10:31:25

11 A. Yes. 10:31:27

12 Q. So can we check that box for both claims 9 and 17? 10:31:28

13 A. Yes. 10:31:34

14 Q. All right. If we turn to the next element, which is the 10:31:35  
15 preprocessing, the first rule set and the second rule set, 10:31:39  
16 can you explain to the Court what is required by this 10:31:42  
17 element? 10:31:45

18 A. So for each of these rule sets, the idea is that you're 10:31:45  
19 going to -- before you actually configure the computing 10:31:51  
20 system to use these rule sets, you'd like to optimize their 10:31:58  
21 performance. 10:32:02

22 So this optimization can take different forms; in 10:32:03  
23 particular, like removing duplicates or setting it up 10:32:06  
24 appropriately to work most efficiently on the engine. But 10:32:10  
25 the idea is that when you have these rule sets, you're going 10:32:15

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1 to prepare them so that they make sense for when you're 10:32:19  
2 actually going to be using them. 10:32:25

3 Q. All right. Thank you, Doctor. 10:32:26

4 I'd like to turn your attention to -- back to 10:32:31  
5 PTX-1294. 10:32:36

6 MR. HANNAH: Your Honor, this has just been admitted 10:32:37  
7 into evidence. 10:32:39

8 THE COURT: 1294? 10:32:43

9 MR. HANNAH: 1294, yes, Your Honor. 10:32:46

10 THE COURT: All right. 10:32:56

11 MR. HANNAH: If we go to Page 15 of this document, 10:32:58  
12 which is the Bates number corresponding to 15, 0015. 10:33:02

13 THE COURT: Right. 10:33:05

14 BY MR. HANNAH: 10:33:10

15 Q. If we look at the bottom section of this document, where 10:33:11  
16 it talks about the policy creation, Doctor, can you explain 10:33:16  
17 for the Court how this informed your opinion with regard to 10:33:20  
18 the preprocessing of the first and second rule set to 10:33:23  
19 optimize performance? 10:33:27

20 A. Right. So it's talking about, you know, creation of 10:33:29  
21 policies, and policies are collections of rules, and, again, 10:33:33  
22 these policies can change according to network conditions and 10:33:40  
23 according to new information received in. And, as it says, 10:33:47  
24 you know, policies are translated by Cisco DNA center into 10:33:51  
25 network-specific and to device-specific configurations that 10:33:56

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1 can be adjusted dynamically, based on network conditions. 10:34:03

2 So, to me, when it's talking about these 10:34:06  
3 network-specific and device-specific configurations, that 10:34:11  
4 says that it's preprocessing and optimizing the rules for the 10:34:14  
5 various devices they will be put on, which are the specific 10:34:18  
6 switches and routers. And, again, we can see the dynamic 10:34:21  
7 adjustments; that the policies may change or be updated 10:34:25  
8 according to the information obtained in the network 10:34:29  
9 conditions. 10:34:36

10 MR. HANNAH: If you could just highlight that, 10:34:37  
11 Geoff. It would just be the second line, starting with 10:34:41  
12 "policies." 10:34:42

13 BY MR. HANNAH: 10:34:42

14 Q. Doctor, can you explain? What does it mean for these 10:34:43  
15 policies to be adjusted dynamically? 10:34:45

16 A. So, again, that means that they change. So they have to 10:34:51  
17 change and respond to various circumstances, and this is why 10:34:54  
18 you get these multiple rule sets. 10:34:58

19 Q. I'd like to move on to a new document, which is PTX-1385. 10:35:11

20 Doctor, can you, please, explain what PTX-1385 is? 10:35:15

21 A. This is a specification document for the DNA center, the 10:35:20  
22 Digital Network Architecture center. I believe this to be an 10:35:31  
23 internal document for Cisco. 10:35:35

24 MR. HANNAH: Your Honor, we'd like to move PTX-1385 10:35:37  
25 into evidence, please. 10:35:42

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1 MR. GAUDET: No objection, Your Honor. 10:35:43

2 THE COURT: 1385 will be admitted. 10:35:43

3 (Plaintiff's Exhibit PTX-1385 was received in 10:35:46  
4 evidence.) 10:35:47

5 MR. HANNAH: Thank you, Your Honor. 10:35:47

6 BY MR. HANNAH: 10:35:48

7 Q. So if we can go to Page 18 of this document. 10:35:48

8 MR. HANNAH: And, again, Your Honor, it has the same 10:35:51  
9 corresponding Bates label, which is 0018. 10:35:54

10 THE COURT: All right. 10:36:01

11 BY MR. HANNAH: 10:36:01

12 Q. And if we look under 3.4.1, that paragraph and then the 10:36:04  
13 diagram here, Doctor, can you explain what it means when it 10:36:08  
14 says the "Policy discovery" -- in that third line, "Policy 10:36:12  
15 discovery is the process of determining the appropriate rules 10:36:18  
16 that the network should apply to a device"? 10:36:21

17 A. Right. So the policy discovery -- I mean, this is just 10:36:28  
18 saying that the appropriate policy may have to change, right? 10:36:31  
19 We've seen it because of additional information that can come 10:36:35  
20 in through other sources, including, you know, we have seen 10:36:40  
21 intelligence feeds, or Stealthwatch, or other sources that 10:36:47  
22 the appropriate rules of the network that should apply to a 10:36:51  
23 device should change, and so the setup for the Cisco DNA 10:36:54  
24 center is to obtain these changes and, again, distribute them 10:36:59  
25 appropriately throughout the routers and switches in the 10:37:03

Mitzenmacher, M. - Direct

1 network. 10:37:09

2 Q. And can you explain what's being shown with the diagram 10:37:09  
3 that's being shown on the screen and how this maps to the 10:37:14  
4 preprocessing of the first and second rule set to optimize 10:37:19  
5 the system, as recited in the claims? 10:37:22

6 A. Right. So the policy discovery is showing some of the 10:37:25  
7 ways that it can take new incoming information, and there 10:37:31  
8 will be, based on that, new policy -- new policies developed. 10:37:38  
9 So that means changing the rules, right? Whenever you have a 10:37:41  
10 new policy, the way that policy is implemented is you have to 10:37:44  
11 change the corresponding rules on the devices. 10:37:48

12 And so you can see that it goes through the sequence 10:37:52  
13 of discovery, modeling, selection, which may go through 10:37:56  
14 editing and approval, and eventually this policy gets 10:38:00  
15 deployed, right? So it gets put onto the network. So this 10:38:04  
16 shows, again, that there is various preprocessing and 10:38:07  
17 optimization of the proposed rules in order to -- before 10:38:12  
18 they're deployed. 10:38:18

19 Q. With that, I'd like to move to PTX-1348. 10:38:19

20 Doctor, can you explain what PTX-1348 is? 10:38:35

21 A. This is a paper that Cisco developed that's written in a 10:38:38  
22 sort of more formal academic paper framework that describes 10:38:50  
23 the Cisco Digital Network Architecture. 10:38:56

24 MR. HANNAH: Your Honor, at this point we'd like to 10:39:02  
25 move PTX-1348 into evidence, please. 10:39:03

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1 MR. GAUDET: No objection, Your Honor. 10:39:07

2 THE COURT: PTX-1348 will be admitted. 10:39:08

3 (Plaintiff's Exhibit PTX-1348 was received in 10:39:12  
4 evidence.) 10:39:13

5 MR. HANNAH: Thank you, Your Honor. 10:39:13

6 BY MR. HANNAH: 10:39:14

7 Q. If we could go to Page 5 of this document. 10:39:14

8 MR. HANNAH: And, Your Honor, this also has 10:39:22  
9 corresponding Bates label 0005. 10:39:24

10 THE COURT: All right. 10:39:28

11 BY MR. HANNAH: 10:39:29

12 Q. If we go to the second paragraph under "Automation," can 10:39:30  
13 you explain what this paragraph is showing in the context of 10:39:39  
14 automation for the DNA center? 10:39:45

15 A. Sure. So this is saying that, as I said in the first 10:39:46  
16 sentence, "The DNA controller is vital to drive the policies 10:40:00  
17 associated with digitalized services consistently throughout 10:40:04  
18 the network infrastructure." 10:40:09

19 So, here again, what we're seeing is that it's the 10:40:13  
20 controller that is going to -- when it says, "drive the 10:40:17  
21 policies," that's, you know, manage, send out, and update the 10:40:20  
22 corresponding rule sets. 10:40:26

23 So, as it says, like, it translates the business 10:40:29  
24 intent or the digital services into an actionable and 10:40:34  
25 verifiable network policy. So the policies themselves are 10:40:40



Mitzenmacher, M. - Direct

1 going to be updated, changed, and, as it says in the next,  
2 that the policies may need to be multiple domain-specific  
3 network policies. So, again, this matches what we had  
4 previously seen; that the policies would have to be set up  
5 appropriately or managed appropriately for the specific  
6 devices that they were going to be placed on.

7 "The DNA controller thus implements policy in any  
8 part of the network that a service instance reaches." So,  
9 again, the DNA controller is passing around and  
10 substantiating sending the policy, including the needed  
11 updates, to all the corresponding devices, the routers, and  
12 switches that it controls.

13 And I guess just at the end, you know, it discusses,  
14 "For all variants of policies" -- again, there are going to  
15 be multiple policies around -- "such as those governing  
16 access, transport, or path optimization." So it's doing  
17 various processing of the rules in order to set them up  
18 appropriately for the domain.

19 Q. How does that inform your opinion whether the rules are  
20 preprocessed to optimize performance?

21 A. Well, to me, this also says that the rules are  
22 preprocessed to optimize performance on the given network.

23 MR. HANNAH: Your Honor, at this point we'd like to  
24 show some source code, so we would like to seal the  
25 courtroom, in accordance with the procedure that we discussed

Mitzenmacher, M. - Direct

1 earlier. 10:42:27

2 THE COURT: All right. For those people who are 10:42:29  
3 observing via audio, this is the same thing we did yesterday, 10:42:31  
4 and it's equivalent to having a bench conference from which 10:42:40  
5 the audience is excluded. So I'll ask the host to please 10:42:52  
6 mute the audio at this time. 10:43:00

7 MR. GAUDET: Your Honor, this is Matt Gaudet. 10:43:09

8 We would just ask, again, for Centripetal's 10:43:11  
9 confirmation that Jonathan Rogers and any other fact 10:43:13  
10 witnesses for Centripetal also step out just for this 10:43:18  
11 portion. 10:43:22

12 THE COURT: All right. 10:43:25

13 MR. HANNAH: Yes, Jonathan Rogers will leave the 10:43:30  
14 room, and then we'll let him know when he can come back. 10:43:33

15 And I believe I already moved this in, but just in 10:43:37  
16 case, Your Honor, we'd like to move in PTX-1348, which is the 10:43:40  
17 article we just discussed that described the Digital Network 10:43:44  
18 Architecture. 10:43:49

19 THE COURT: Yes, I have that as admitted. 10:43:52

20 MR. HANNAH: Okay. Thank you, Your Honor. 10:43:55

21 (Confidential testimony from Page 592, Line 21,  
22 through Page 595, Line 15, was redacted.)

23 \* \* \* \* \*

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Mitzenmacher, M. - Direct

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13 (Confidential testimony from Page 592, Line 21,  
14 through Page 595, Line 15, was redacted.)

15 \* \* \* \* \*

10:48:31

16 BY MR. HANNAH:

10:48:31

17 Q. Doctor, based on the evidence that you reviewed, do the  
18 Cisco Catalyst switches and the ASR and ISR routers -- do  
19 they meet the preprocessing, the first rule set and second  
20 rule set element, as set forth in claims 9 and 17?

10:48:32

10:48:36

10:48:41

10:48:47

21 A. Yes, they do.

10:48:51

22 Q. And can we check that box?

10:48:52

23 A. Yes.

10:48:54

24 Q. All right. I'd like to move to the next claim element,  
25 which is the configure the at least two processors, the after

10:48:55

10:48:59

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1 processing, and the process elements. And I see that we've 10:49:07  
2 bolted these all together. Can you explain to the Court why 10:49:11  
3 we grouped them together and what they require? 10:49:14

4 A. Yeah. During my explanation, I think it makes sense to 10:49:16  
5 run these all together, since they're all related to the 10:49:21  
6 first rule set. 10:49:26

7 And what this is saying is that, you know, once the 10:49:27  
8 first rule set is available or ready, we're going to 10:49:30  
9 configure the system. So now we're moving from the DNA 10:49:34  
10 center to the actual routers and switches, and we're going to 10:49:38  
11 configure those processors on the routers and switches to use 10:49:44  
12 the first rule set. 10:49:50

13 So, obviously, when it says the first rule set, uses 10:49:51  
14 the first rule set, what that means is you've got to set it 10:49:55  
15 up or configure it to use that first rule set. You know, 10:49:58  
16 once it's set up, you'll start receiving packets, and you'll 10:50:05  
17 actually use that first rule set to process those packets. 10:50:08  
18 So these three naturally come together and discuss what 10:50:13  
19 you're going to do with the first rule set. 10:50:17

20 Q. All right. So if we can move to the PTX-1195. 10:50:20

21 And, Doctor, can you explain what this is? 10:50:41

22 A. Right. So I'll be referring to this sort of for a 10:50:44  
23 while -- or this sort of system for a while. 10:50:49

24 They refer to this method for updating within Cisco 10:50:54  
25 that they sometimes refer to. This is a hitless ACL update. 10:50:58

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1 Remember, ACL is Access Control List, so that's, again, a way 10:51:05  
2 of saying, you know, rules -- or a collection that 10:51:11  
3 corresponds to rules. 10:51:15

4 I forget what FED stands for, but that's their name, 10:51:17  
5 I think, for this project. And so this is the specification 10:51:23  
6 describing how the rules and rule swap works in this setting. 10:51:26

7 MR. HANNAH: Your Honor, at this point we'd like to 10:51:33  
8 move PTX-1195 into evidence. 10:51:35

9 THE COURT: That will be admitted. 10:51:37

10 (Plaintiff's Exhibit PTX-1195 was received in 10:51:39  
11 evidence.) 10:51:43

12 BY MR. HANNAH: 10:51:43

13 Q. All right. Doctor, I'd like to turn your attention to 10:51:43  
14 Page 3 of this document. 10:51:46

15 And if we look under 2.1, can you explain what's 10:51:53  
16 being shown here? 10:51:57

17 A. So this document is describing -- you know, it's a 10:51:59  
18 specification that's describing both the old system and the 10:52:08  
19 new system, so this is -- right now, in this section, it's 10:52:11  
20 describing the system that I just listed previous, when they 10:52:18  
21 implemented this version. 10:52:27

22 And I guess of particular importance in the top is 10:52:28  
23 that currently whenever there's a change to the ACE and the 10:52:31  
24 ACL, the data will drop packets during the change to the 10:52:37  
25 hardware programming. So this is describing a system. 10:52:40

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1           Again, ACL is Access Control List. ACE is, if I'm 10:52:45  
2 remembering right, Access Control Element. So it's like a 10:52:50  
3 member of the list. It's like one of the rules in this 10:52:54  
4 collection or list of rules. And what it's saying is that, 10:52:57  
5 you know, with the previous system, you know, it would be set 10:53:02  
6 that, whenever there was a change, there might be a brief 10:53:07  
7 period where it might drop packets in order to deal with 10:53:12  
8 changing that rule set. And, as we'll see, the new system is 10:53:15  
9 designed differently. 10:53:20

10           But, in particular, overall what this document shows 10:53:22  
11 with relation to what we were talking about before -- and 10:53:26  
12 we'll see this both in the other section -- is that there is 10:53:30  
13 like a first rule set. This is the ACL, that rule set before 10:53:32  
14 the change, and that rule set is, of course, processing 10:53:39  
15 packets. 10:53:42

16           THE COURT: Is this change what makes the operating 10:53:44  
17 system dynamic? 10:53:51

18           THE WITNESS: That is one of the things, yeah. I 10:53:52  
19 mean, that is one of the things that I would say makes the 10:53:55  
20 system dynamic, is that it can change the rules as needed, as 10:53:58  
21 new situations come up, as it gets more information. 10:54:03

22 BY MR. HANNAH: 10:54:05

23 Q. So, Doctor, is it fair to say that the old system would 10:54:13  
24 drop packets when the rules would be changed, but then the 10:54:19  
25 new system would not drop any packets? 10:54:24

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1 A. That's the way it's set up, yes, definitely, and I think 10:54:27  
2 this is part of the reason for the change. And, as I said, 10:54:32  
3 in particular with regard to the claim elements, the fact 10:54:38  
4 that it's dropping packets shows that the previous rules were 10:54:41  
5 designed to handle packets. 10:54:45

6 THE COURT: Well, what would happen under the 10:54:47  
7 previous system, I suppose, is if the packets were dropped 10:54:51  
8 while the system was being changed, you'd have to put them 10:54:59  
9 through the system again to get past the new rules. Is that 10:55:04  
10 what you're doing? 10:55:08

11 THE WITNESS: So during the time of the rule change, 10:55:08  
12 the idea is that you don't want to let anything dangerous 10:55:09  
13 pass, so during the rule change, to be safe, you might drop 10:55:13  
14 some packets, and the idea is that they would be resent later 10:55:18  
15 and then examined again when the new rule set was 10:55:23  
16 substantiated. 10:55:26

17 THE COURT: All right. So this technology prevents 10:55:28  
18 you from having to do that. 10:55:31

19 THE WITNESS: Right. 10:55:33

20 THE COURT: And it's supposed to work very fast so 10:55:34  
21 that the user wouldn't notice any delay in the packets moving 10:55:37  
22 through the system. 10:55:42

23 THE WITNESS: Absolutely. You don't want the user 10:55:43  
24 to notice anything in particular. If there's dropped 10:55:47  
25 packets, the user might notice, and that can be problematic. 10:55:53

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1 So, right, the entire design is to make it more invisible to 10:55:56  
2 the users so they won't see dropped packets and the 10:56:02  
3 corresponding delay. 10:56:06

4 THE COURT: All right. 10:56:09

5 BY MR. HANNAH: 10:56:10

6 Q. That leads us to the next page of this document, which is 10:56:11  
7 Page 4. 10:56:14

8 MR. HANNAH: And it has the same corresponding Bates 10:56:17  
9 label, Your Honor, as 004. 10:56:19

10 BY MR. HANNAH: 10:56:19

11 Q. If we highlight that top paragraph, Doctor, can you 10:56:23  
12 explain what the feature is that they've put into the 10:56:27  
13 products to prevent the dropping of the packets while the 10:56:31  
14 rules are being swapped? 10:56:34

15 A. For this new feature, no packet should drop when 10:56:35  
16 programming the new TCAM. So TCAM is one of our 10:56:40  
17 abbreviations on the abbreviation list, ternary 10:56:45  
18 content-addressable memory. That's where the rules are going 10:56:49  
19 to get stored. 10:56:53

20 And this may come up later, but ternary 10:56:55  
21 content-addressable memory is a special type of way of 10:57:00  
22 storing data in memory, in particular storing the rules of 10:57:05  
23 memory that allows very, very quick tracking of the packet 10:57:10  
24 header information to see if it matches any rules. And, 10:57:13  
25 remember, the rules are what will tell you whether it's 10:57:17



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1 dropped or allowed or, in other cases, where to send the 10:57:19  
2 packet on to. 10:57:29

3 Right, so the main point here is exactly that: They 10:57:34  
4 have this new feature, this new system, so that no packets 10:57:37  
5 should drop, but, in particular, this shows that they have 10:57:41  
6 rule sets, the rule sets are designed to be changed and 10:57:43  
7 updated. So there's a first rule set, and the first rule set 10:57:46  
8 is handling packets as required by the claim element. 10:57:49

9 THE COURT: Well, there has to be some unit of time 10:57:54  
10 that's consumed by changing the rule set, however minute that 10:58:02  
11 time frame may be. 10:58:10

12 THE WITNESS: That's exactly right, and we're going 10:58:13  
13 to be talking about that in the later claim elements. And 10:58:15  
14 what has to happen is that the claim elements are going to 10:58:18  
15 discuss that during that changeover, you need to buffer or 10:58:23  
16 store the packets so that during that quick time where you're 10:58:28  
17 changing the rules, you can just sort of hold packets and 10:58:32  
18 have them wait without having to drop them, without losing 10:58:35  
19 them for that small delay, and then you get back to 10:58:39  
20 processing the packets again as quickly as possible. 10:58:43

21 THE COURT: Well, that's what this TCAM is? 10:58:46

22 THE WITNESS: The TCAM -- the TCAM is the memory for 10:58:49  
23 the rules. There's going to be a separate memory. It's 10:58:58  
24 going to be called in the claim elements, I think, a cache 10:59:01  
25 that holds the actual packets while they're waiting. 10:59:07

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1           So you need memory for the rules, but you also need 10:59:10  
2           memory for the packets during the switchover. 10:59:12

3           THE COURT: All right. 10:59:17

4           BY MR. HANNAH: 10:59:17

5           Q. If we look later in this document, on this page, it says, 10:59:20  
6           "The sequence of events that are being illustrated here." 10:59:25

7                     Can you explain for the Court what's being shown 10:59:30  
8           here in terms of the sequence of events and how this process 10:59:32  
9           works? 10:59:36

10          A. Right. So the first two elements -- or the first two 10:59:39  
11          parts are saying about, okay, there's been some sort of 10:59:42  
12          change. You've received something which says, I want to 10:59:47  
13          change something in the rule set. And so, you know, when 10:59:50  
14          that happens, there's a corresponding policy update, and when 10:59:59  
15          there's a policy update, right, then you go through the 11:00:07  
16          sequence of steps, where, if you look at 9 and 10, you're 11:00:12  
17          going to add the new TCAM entries, right, you're going to put 11:00:19  
18          in the new sets of rules, delete out the old rules, and then 11:00:24  
19          return success. 11:00:29

20                     As you pointed out, there needs to be some sort of 11:00:32  
21          delay. There's going to be some sort of delay between the 11:00:35  
22          points where you are deciding, okay, I'm going to put in the 11:00:39  
23          new rules, delete the old rules, and now switch over entirely 11:00:45  
24          to the new system, and that delay is when, as the rest of the 11:00:49  
25          claim elements discuss, you're going to need to cache the 11:00:54

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1 packets in order to make sure you don't drop anything. 11:01:02

2 THE COURT: All right. Well, these 11 steps take 11:01:05  
3 place, I suppose, in a fraction of a second, or something. 11:01:09

4 THE WITNESS: They do. Ideally, they will take 11:01:16  
5 place in some part of a second, but these devices have to 11:01:18  
6 handle millions, in some cases billions, or these days it's 11:01:25  
7 getting to be incredibly fast. They're handling lots of 11:01:32  
8 packets a second, so you still need -- even if it's just a 11:01:36  
9 fraction of a second, that could be dropping a number of 11:01:39  
10 packets, if you aren't careful, and the patent describes 11:01:43  
11 exactly how to be careful or how to deal with that issue. 11:01:48

12 THE COURT: Okay. 11:01:53

13 THE WITNESS: I realize to a person it seems like a 11:01:54  
14 really short time -- it's like all this happens in a very 11:01:56  
15 small amount of time -- but your computer -- it's a long time 11:01:59  
16 that corresponds to, potentially, a significant amount of 11:02:04  
17 information. 11:02:08

18 THE COURT: All right. 11:02:11

19 BY MR. HANNAH: 11:02:13

20 Q. All right. Doctor, I'd like to turn your attention to 11:02:14  
21 PTX-1288. And this document has been admitted into evidence 11:02:16  
22 already, and we're going to turn to Page 12. 11:02:21

23 Doctor, can you explain how this informed your 11:02:46  
24 opinion with regard to this claim element? 11:02:48

25 A. We've seen this diagram before, and this is just how, 11:02:50

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1 once the rules are set up or -- 11:02:58

2 THE COURT: Where are we, here? 11:03:02

3 MR. HANNAH: Page 12, Your Honor, which has the same 11:03:05  
4 corresponding Bates label of 0012, on PTX-1288. 11:03:07

5 THE COURT: Right, got it. 11:03:21

6 BY MR. HANNAH: 11:03:24

7 Q. Doctor, can you explain how this informed your opinion as 11:03:25  
8 to these elements of the claims? 11:03:29

9 A. So this is -- we've seen this diagram before, but this 11:03:32  
10 diagram is explaining, again, how in the routers and switches 11:03:41  
11 the rule sets act on the packets. The packets come in, and 11:03:45  
12 they'll be processed, and it will be determined whether they 11:03:49  
13 get forwarded or dropped, depending on the outcome of the 11:03:53  
14 tests and the various rules. And, again, it's these rules 11:04:01  
15 which are stored in that TCAM, ternary content-addressable 11:04:04  
16 memory, that we've seen. 11:04:10

17 THE COURT: Wait. I don't understand the 11:04:16  
18 relationship. Does this diagram demonstrate the steps in the 11:04:19  
19 TCAM? 11:04:30

20 THE WITNESS: So this diagram doesn't demonstrate 11:04:31  
21 specifically the steps in the TCAM. What it's showing is 11:04:35  
22 there are actually -- these rules, remember, are the ACLs, 11:04:41  
23 and there are different types of AC Ls. You can see 11:04:44  
24 different letters in front, like GACL, PACL, VACL. 11:04:49

25 We're just showing this diagram to reinforce that -- 11:04:55

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1 because part of the claim element is that you process the 11:04:59  
2 packets using the first rule set, and that's what this 11:05:02  
3 diagram shows. The rule sets correspond to these ACLs, and 11:05:07  
4 what the devices do is check against these ACLs, these rule 11:05:11  
5 sets, to determine whether the packet should be forwarded or 11:05:18  
6 denied. 11:05:21

7 THE COURT: Well, you say this is the first rule 11:05:22  
8 set. How do we know it's the first instead of the new one -- 11:05:25  
9 or the second one? 11:05:30

10 THE WITNESS: So this diagram -- that's a good 11:05:30  
11 question -- would apply equally well to both. This is just 11:05:33  
12 showing how a rule set acts. And once you replace the first 11:05:37  
13 rule set with the second rule set, it will also go through 11:05:42  
14 the same set of steps, but it has just a different collection 11:05:45  
15 of rules. 11:05:49

16 THE COURT: All right. 11:05:50

17 BY MR. HANNAH: 11:05:56

18 Q. Thank you, Doctor. 11:06:02

19 So I'd like to show you some deposition testimony, 11:05:59  
20 and this is the deposition testimony of Peter Jones. I'd 11:06:04  
21 actually like to start with the deposition of Peter Jones, 11:06:10  
22 which is PTX-1920, and it's Page 55, 18 to 21, Geoff. 11:06:15

23 MR. HANNAH: Your Honor, this one that's being shown 11:06:38  
24 on the screen is PTX-1915, which is in your binder. 11:06:40

25 THE COURT: This -- I thought you said 1920. 11:06:45

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1 MR. HANNAH: Your Honor, I was trying to get that 11:06:51  
2 one on the screen, but this one popped up first, so I was 11:06:53  
3 just going to -- I can do either one. We're going to talk 11:06:56  
4 about both of them right now. 11:06:58

5 THE COURT: All right. So we're looking at -- 11:07:00

6 MR. HANNAH: This is PTX-1915. 11:07:04

7 THE COURT: All right. 11:07:13

8 MR. HANNAH: Your Honor we'd like to move PTX-1915 11:07:18  
9 into evidence, please. 11:07:21

10 THE COURT: PTX-1915 will be admitted. 11:07:25

11 (Plaintiff's Exhibit PTX-1915 was received in 11:07:30  
12 evidence.) 11:07:32

13 MR. HANNAH: Thank you, Your Honor. 11:07:32

14 BY MR. HANNAH: 11:07:34

15 Q. Doctor, can you, please, explain what is being shown here 11:07:34  
16 in the testimony of Mr. Jones? 11:07:37

17 A. The system I had talked about, they sometimes refer to it 11:07:39  
18 with the name "hitless," and this deposition testimony is 11:07:46  
19 describing what Peter Jones understands hitless to mean, and, 11:07:54  
20 as he says here, it's that you can change from rule set A to 11:07:58  
21 rule set B and not drop packets in the middle or not have 11:08:04  
22 them not subject to rules. 11:08:08

23 So the idea is that when you're doing a rule swap, 11:08:11  
24 if you're not careful, you have to worry about the packets 11:08:15  
25 that are still coming in that you're supposed to process. 11:08:18

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1 You don't want to just drop them, unless you have to, right, 11:08:23  
2 because dropping them, as you said, the user might notice. 11:08:26  
3 It will cause a delay; it will cause a potential problem for 11:08:31  
4 the system. 11:08:35

5 THE COURT: Now, let me -- this is, I guess, the 11:08:38  
6 third time we've seen Peter Jones. He's an employee of 11:08:43  
7 Centripetal? 11:08:54

8 MR. HANNAH: Cisco, Your Honor. 11:08:55

9 THE COURT: Oh, he's a Cisco employee? 11:08:56

10 MR. HANNAH: Correct. 11:08:59

11 THE COURT: Okay. All right. 11:09:01

12 THE WITNESS: So, as I was saying, you know, he's 11:09:02  
13 asked about hitless. They refer to this -- refer to this in 11:09:04  
14 a document sometimes as hitless, and he's explaining what 11:09:11  
15 they mean. And he's considering exactly the situation that 11:09:15  
16 we're talking about, where you say, well, I have to change 11:09:18  
17 the rule set, so I'm changing from one rule set -- he calls 11:09:20  
18 it rule set A -- to another rule set, rule set B. 11:09:25

19 And when this change happens, if you're not 11:09:29  
20 careful -- you know, you have to do something with the 11:09:34  
21 packets, because you're still dealing with packets, while the 11:09:36  
22 rules change. And one thing you could do is just say, well, 11:09:40  
23 I'm busy changing the rules, so I'm going to drop the 11:09:43  
24 packets. As we've described, that's problematic because that 11:09:46  
25 can cause delay or you've lost information that the system is 11:09:51

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1 going to, you know, have to get back later in time. 11:09:56

2 The other thing you can do is you also don't want to 11:10:03  
3 have them not subject to rules. You don't want to say, well, 11:10:06  
4 I'm busy right now changing the rules, so you can pass 11:10:10  
5 through, because that might let something dangerous through. 11:10:12  
6 So what he's saying is by "hitless" he means that you don't 11:10:17  
7 have this period where the packets are thrown away, but you 11:10:22  
8 still manage to deal with all the packets and apply the 11:10:26  
9 rules, as appropriate. 11:10:29

10 BY MR. HANNAH: 11:10:32

11 Q. So, Doctor, if we're mapping rule set -- if we're mapping 11:10:35  
12 this to the claim element, is rule set A the first rule set? 11:10:40

13 A. Yes. Rule set A would be like the corresponding first 11:10:45  
14 rule set, and rule set B will be the second rule set. 11:10:50

15 Q. Great. Thank you, Doctor. 11:10:54

16 If we could go to PTX-1920. Again, this is the 11:10:59  
17 deposition testimony of Peter Jones. 11:11:10

18 MR. HANNAH: And, Your Honor, he's the distinguished 11:11:12  
19 engineer from Cisco Systems. 11:11:15

20 THE COURT: Well, I knew the other ones were, but I 11:11:18  
21 didn't know he was. Okay. 11:11:23

22 MR. HANNAH: Yeah, all of the deposition testimony 11:11:25  
23 that we've shown thus far has been the Cisco employees. 11:11:27

24 THE COURT: Right. 11:11:31

25 BY MR. HANNAH: 11:11:35



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1 Q. Doctor --

11:11:35

2 MR. HANNAH: And for the record, this is his  
3 November 26, 2019 deposition at Page 55, lines 18 to 21.

11:11:37

11:11:39

4 Your Honor, at this time we'd like to move in  
5 PTX-1920 into evidence, please.

11:11:47

11:11:50

6 THE COURT: Yes, that will be admitted.

11:12:01

7 (Plaintiff's Exhibit PTX-1920 was received in  
8 evidence.)

11:12:03

11:12:03

9 MR. HANNAH: Thank you, Your Honor.

11:12:03

10 BY MR. HANNAH:

11:12:04

11 Q. So, Doctor, can you explain how this testimony informed  
12 your opinion as to whether the Catalyst switches and also the  
13 corresponding routers are configured -- configure at least  
14 two processors to process packets in accordance with the  
15 first rule set and then subsequently process those packets?

11:12:05

11:12:08

11:12:13

11:12:18

11:12:21

16 A. Yes. So, as we discussed, you know, they use the  
17 terminology "policies" for talking about what gets -- what's  
18 sent, but policies are sets of rules, so this is just  
19 confirming that.

11:12:25

11:12:30

11:12:34

11:12:38

20 Q. Thank you.

11:12:38

21 I'd like to turn back at this time to the claims.

11:12:44

22 And looking at the claims, we have this language of,

11:12:53

23 "configure at least two processors of the competing system."

11:12:58

24 Can you remind the Court what are the two processors  
25 and how that meets the claims, based on the documents that we

11:13:02

11:13:07

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1 saw yesterday?

11:13:09

2 A. Right. So we've seen, actually, that there are, you  
3 know, multiple processors, and they are all used in the work  
4 of processing packets according with the rules. There's the  
5 central processing unit, and that's, in fact, multicore and  
6 has several processors.

11:13:10

11:13:13

11:13:19

11:13:25

11:13:30

7 There was also the UADP, Unified Access Data Plane,  
8 which, again, has the various TCAM memory, and that's used  
9 for some of the lower level rule processing. That also, in  
10 fact, then, in the systems -- I believe there's other  
11 documents that we may have that will show that, that those  
12 themselves consist of multiple processors.

11:13:32

11:13:38

11:13:44

11:13:50

11:13:53

11:13:59

13 So there's plenty of processors around that are  
14 processing packets in accordance with the first rule set.

11:14:04

11:14:08

15 THE COURT: So it has to go through more than one  
16 security test, is what you're saying, in the network.

11:14:14

11:14:19

17 THE WITNESS: There's more than one computer core  
18 that's processing the rules.

11:14:23

11:14:29

19 THE COURT: It could be one switch and one router.

11:14:30

20 THE WITNESS: Well, one could, I suppose, interpret  
21 it that way at the level of the system. That's certainly  
22 true. But I was also thinking, particularly like even on a  
23 single switch or router, there's multiple processors in every  
24 single -- in even a single switch or router, as well.

11:14:38

11:14:45

11:14:48

11:14:52

11:14:58

25 THE COURT: Well, when you see a switch, it has

11:15:03

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1 multiple little symbols on it --

11:15:10

2 THE WITNESS: Yeah.

11:15:19

3 THE COURT: -- and each one of those represents a  
4 processor?

11:15:21

11:15:22

5 THE WITNESS: I'm not sure I would view it as each  
6 of those correspond to a processor, but if you look at the  
7 data sheet, it talks specifically about the multicores, and  
8 if you look at the UADP, the UADP itself is --

11:15:23

11:15:26

11:15:32

11:15:37

9 THE COURT: The what? The UADP?

11:15:43

10 THE WITNESS: Yeah. That's the Unified Access Data  
11 Plane. That's like the processor part, or that's the part of  
12 the system -- the integrated circuit that specifically deals  
13 with looking at the header information in the packets.

11:15:45

11:15:50

11:15:57

11:16:05

14 THE COURT: Well, why do you have to have at least  
15 two? I mean, other than that's what the rule says.

11:16:07

11:16:13

16 THE WITNESS: So, primarily, I think --

11:16:16

17 THE COURT: I don't mean the rule; the claim.

11:16:20

18 THE WITNESS: So I think it's primarily that this  
19 was set up for the various speeds, and the assumption was  
20 that you would have multiple processors. And, in particular,  
21 when you decide that you've finally switched over to the  
22 second set of rules, in that case you have to synchronize to  
23 make sure that everyone is on the same page, so that all the  
24 processors are sort of using the same rule set.

11:16:25

11:16:27

11:16:31

11:16:37

11:16:42

11:16:47

11:16:52

25 And so there's -- we'll see in the coming claim

11:16:55

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1 elements there's a signaling. So the idea is that you would 11:16:58  
2 use multiple processors for efficiency, and then part of this 11:17:02  
3 claim is dealing with the fact that, well, if you're using 11:17:08  
4 multiple processors for efficiency, you have to make sure 11:17:12  
5 that they're all working together, behaving the same way when 11:17:15  
6 dealing with the change in the rule set. 11:17:20

7 And so we'll see -- it's one of those things that -- 11:17:23  
8 you have a really good question, and I think the problem is 11:17:27  
9 it's coming up on the next page, when we get to the remaining 11:17:31  
10 claim elements. 11:17:34

11 But the reason to have multiple processors is that, 11:17:35  
12 you know, that way you can handle more packets, and the speed 11:17:40  
13 of these devices is of paramount importance. 11:17:46

14 BY MR. HANNAH: 11:17:49

15 Q. If we could go to PTX-175, I think it will help to show 11:17:50  
16 the document that we saw yesterday. 11:17:54

17 If we go to the page ending in Bates number 598, 11:17:59  
18 where it talks about the multicore processors and the related 11:18:10  
19 description, can you just explain how this supports your 11:18:16  
20 opinion with regard to the multiple processors and the 11:18:21  
21 switches and the routers. 11:18:27

22 A. Right. So, first of all, they've got the multicore 11:18:30  
23 processors. So, again, that means that there's actually sort 11:18:34  
24 of multiple processors on a single chip. 11:18:38

25 And then it also discussed using a flow processor, 11:18:42

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1 so that's related to the UADP that I think we talked about 11:18:51  
2 before. So that's like another processor that it's using to 11:18:55  
3 specifically handle the matching portions of the rules. 11:19:02

4 THE COURT: Well, does the number of processors have 11:19:07  
5 any effect on the volume of packets that you can process in a 11:19:11  
6 given period of time? 11:19:18

7 THE WITNESS: Absolutely. So the way that these 11:19:19  
8 things are set up these days is that, instead of trying to 11:19:23  
9 make a single processor super-fast, there can be limits on 11:19:30  
10 how fast or it can become very expensive to make a single 11:19:35  
11 processor faster, so, instead, you use multiple processors on 11:19:38  
12 a device, and that way you can get the speed. You know, it's 11:19:44  
13 like having, you know, two or three or four people working on 11:19:49  
14 a job instead of just trying to speed up a single person, 11:19:54  
15 right? So you can get more speed, and you get a better 11:19:59  
16 efficiency price tradeoff. 11:20:03

17 THE COURT: Okay. 11:20:09

18 BY MR. HANNAH: 11:20:09

19 Q. And all of these processors will be implementing all of 11:20:10  
20 the rules at the same time. Is that right, Doctor? 11:20:13

21 A. That's what we'll see in the next part. 11:20:15

22 Q. If we can turn back to the claim language. 11:20:18

23 Can you just give a summary in terms of how the 11:20:28  
24 remaining two elements are met by the Catalyst switches and 11:20:30  
25 the ASR and ISR routers? 11:20:34

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1 A. Sure. So this is after preprocessing, the first rule set 11:20:37  
2 and the second rule set, and configuring at least two 11:20:42  
3 processors to process packets in accordance with the first 11:20:46  
4 rule set. 11:20:50

5 So keep in mind that you've got the first rule set, 11:20:52  
6 you've configured the first rule set. At some point you'll 11:20:54  
7 get the second rule set, and that will be preprocessed. As 11:20:57  
8 we've discussed, it will be preprocessed up on the Digital 11:21:01  
9 Network Architecture center. 11:21:06

10 All during this time you're still handling packets 11:21:08  
11 according to the first rule set, and so, you know, your 11:21:11  
12 switch or router device is receiving packets, and you're 11:21:15  
13 working with the first rule set, maybe even after you've 11:21:18  
14 configured and installed the first rule set and even as the 11:21:25  
15 second rule set is being prepared for you. 11:21:29

16 And then, of course, as the last step, you do 11:21:35  
17 process the packets. 11:21:38

18 Q. So, Doctor, with that, can we check the boxes -- 11:21:40

19 A. Yes. 11:21:43

20 Q. -- for both claims 9 and 17? 11:21:43

21 A. Yes. 11:21:45

22 Q. All right. So if we turn to the remaining elements of 11:21:46  
23 the claim, and here -- 11:21:53

24 THE COURT: You've checked all three at once. Was 11:21:57  
25 that intentional? 11:22:01

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1 MR. HANNAH: Yes. 11:22:05

2 BY MR. HANNAH: 11:22:06

3 Q. Go ahead, Doctor. Can you explain why we checked all 11:22:07  
4 three at once? 11:22:09

5 A. Right. So, as I mentioned before, I was putting all 11:22:10  
6 three of these up at once because these are all talking about 11:22:13  
7 essentially dealing with packets using the first rule set. 11:22:17  
8 So they all sort of go together, because it's configuring 11:22:21  
9 using the first rule set and then receiving packets and 11:22:25  
10 processing them with the first rule set, and so they all go 11:22:30  
11 together. That's sort of the starting point dealing with the 11:22:35  
12 first rule set. 11:22:38

13 Now, we'll be talking about starting the switchover, 11:22:40  
14 the actual swap part, in the next few claim elements. 11:22:45

15 THE COURT: All right. 11:22:50

16 BY MR. HANNAH: 11:22:50

17 Q. So turning to the swap elements, can you explain for the 11:22:53  
18 Court what's being shown here in these next two elements and 11:22:57  
19 why you've grouped these together. 11:23:01

20 A. So now what is going to happen is in the switchover, 11:23:04  
21 there will be some sort of signal that says, all right, it's 11:23:11  
22 time now to switch over, and what we're going to do is switch 11:23:15  
23 over and configure the processors to now use the second rule 11:23:19  
24 set. 11:23:23

25 THE COURT: All right. I think this is a good time 11:23:24

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1 to take our morning recess. We'll be in recess until 11:40. 11:23:28

2 (Recess from 11:23 a.m. to 11:42 a.m.) 11:29:11

3 THE COURT: All right, you may resume. 11:42:10

4 MR. HANNAH: Thank you, Your Honor. 11:42:15

5 BY MR. HANNAH: 11:42:15

6 Q. So, Doctor, if you could just look at these claims here, 11:42:17

7 and we'll be talking about the signal, each processor 11:42:21

8 element, and the configure each processor. 11:42:27

9 Are the claim elements identical between claim 9 and 11:42:30

10 claim 17? 11:42:34

11 A. Yes. 11:42:37

12 Q. So we can take those at the same time? 11:42:38

13 A. Yes. 11:42:40

14 Q. All right. So let's turn to PTX-1195. 11:42:41

15 MR. HANNAH: PTX-1195 has already been entered into 11:42:55

16 evidence, Your Honor. 11:42:57

17 THE COURT: Right. 11:42:59

18 BY MR. HANNAH: 11:43:02

19 Q. And if we go to Page 4 of this document, which is the 11:43:02

20 sequence, can you explain where in the process, in this 11:43:07

21 sequence that we're talking about here, when we're discussing 11:43:13

22 the signal to each processor to process packets in accordance 11:43:18

23 with the second rule set and the configuration elements. 11:43:23

24 A. Right. So that occurs where it says -- I believe, right 11:43:31

25 around where it says, "7. Verify if the feature supports the 11:43:39



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1 hitless ACL change. If supported, continue to step 8." 11:43:46

2 And the point is that that's sort of a signal, 11:43:51  
3 because at that point it's ready to start adding the new rule 11:43:55  
4 sets into the hardware, right, so you can see in steps 8 and 11:43:59  
5 9, it's going to add the things into the hardware and add the 11:44:03  
6 new TCAM entries. 11:44:10

7 So there's sort of -- the way to say it is, there's 11:44:12  
8 a part of the process where it says, all right, I've got 11:44:15  
9 everything ready to go, and I'm going to now change the 11:44:17  
10 hardware. So I've got to stop processing whatever is being 11:44:21  
11 processed, I'm going to do the swap-over, and then once I'm 11:44:27  
12 done, right -- and we'll see that there's a second signal 11:44:34  
13 that I'll be getting to shortly, where you sort of return 11:44:38  
14 success and you're ready to go and move on using the second 11:44:43  
15 rule set. 11:44:47

16 So the first signal, you have to say, okay, 11:44:48  
17 everything is ready to go into the hardware. Now I wait and 11:44:51  
18 stop and then implement the swap. 11:44:54

19 Q. All right. Doctor, if we could turn your attention to 11:44:59  
20 the deposition testimony of Peter Jones -- 11:45:07

21 MR. HANNAH: And, Your Honor, this is in the 11:45:10  
22 deposition binder, the slide. It's PTX-1916. It's the 11:45:14  
23 November 26th, 2019, deposition of Peter Jones, and it's at 11:45:21  
24 Page 67, lines 11 through 21. 11:45:29

25 And, Your Honor, we'd like to move PTX-1916 into 11:45:34

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1 evidence, please. 11:45:38

2 THE COURT: All right. PTX-1916 will be admitted. 11:45:46

3 MR. HANNAH: Thank you, Your Honor. 11:45:50

4 (Plaintiff's Exhibit PTX-1916 was received in 11:45:51  
5 evidence.) 11:45:52

6 BY MR. HANNAH: 11:45:52

7 Q. Doctor, can you explain how this informed your opinion, 11:45:53  
8 the deposition testimony of Peter Jones, as shown on the 11:45:56  
9 slide? 11:46:02

10 A. All right. So, again, he's explaining how he understands 11:46:02  
11 what he means by "hitless TCAM update," and he says, "I can 11:46:07  
12 update an ACL"; that is, I can update a rule, "which is 11:46:11  
13 implement TCAM" -- I suppose that should be, which is 11:46:16  
14 implemented in this ternary content-addressable memory -- 11:46:20  
15 "without interrupting traffic." 11:46:27

16 So this, again, sort of matches what I've been 11:46:28  
17 describing in the documents and elsewhere, which is that the 11:46:32  
18 entire point of this is you're doing a switch. What that 11:46:35  
19 swap corresponds to is that you have to change what's in the 11:46:40  
20 TCAM. So the TCAM, the ternary content-addressable memory, 11:46:46  
21 is where the rules are stored, where you're doing this 11:46:50  
22 swap-over of switching from one rule set to another rule set. 11:46:56  
23 And so it's saying, yeah, I can update it, I can signal that 11:46:59  
24 I'm stopping the first rule set, moving to a second rule set, 11:47:03  
25 and then doing that configuration. 11:47:09

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1 Q. All right. If we turn back to the claims, does this show 11:47:16  
2 that the claim element of the signal, the -- each of the 11:47:24  
3 processors to process packets in accordance with the second 11:47:28  
4 rule set and the configuration elements are met by the 11:47:31  
5 Catalyst switches and the ASR and ISR routers? 11:47:35

6 A. Yes. Where it shows that there's been a single -- 11:47:39  
7 there's going to be a sort of stop-and-switch-over period, 11:47:44  
8 where it configures -- it tells the TCAM, the ternary 11:47:47  
9 content-addressable memory, to go to the next rule set. 11:47:54

10 And then we're going to see in the next collection 11:47:57  
11 there are certain things that you have to do to make this 11:48:00  
12 swap work. 11:48:02

13 Q. All right, Doctor. Can we check those boxes? 11:48:03

14 A. Yes. 11:48:08

15 Q. All right. Let's look at the next element of the claim. 11:48:08

16 And here we have the cease the processing of the one 11:48:16  
17 or more packets and the caching the one or more packets. Do 11:48:22  
18 you see that? 11:48:26

19 A. Yes. 11:48:26

20 Q. And are the claim elements for claim 9 the same claim 11:48:26  
21 elements for claim 17? 11:48:30

22 A. Yes. 11:48:32

23 Q. And we can take those together? 11:48:32

24 A. Yes. 11:48:35

25 Q. So can you explain for the Court what is required here? 11:48:35

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1	A. All right. So once you're starting to do the swap for	11:48:39
2	the second rule set, you want to stop processing any packets.	11:48:44
3	Because as you're doing the update, as the rules are	11:48:47
4	changing, you're in a state of flux. You don't want to	11:48:53
5	accidentally let a packet through that shouldn't get through	11:48:56
6	because you're in a state of flux. And, as we said before,	11:49:00
7	you don't want to just drop packets because you don't want to	11:49:02
8	process them by dropping them, because then you're dropping	11:49:07
9	unnecessarily, and that will cause a delay or dissatisfaction	11:49:12
10	on the user.	11:49:17
11	So what you have to do is stop processing for	11:49:18
12	anything coming in, and anything that you would normally	11:49:21
13	process, you're going to cache. So "cache" here just means	11:49:26
14	hold in memory, you know, wait, have a packet wait in memory	11:49:31
15	until you're ready to actually deal with it with the second	11:49:38
16	rule set.	11:49:40
17	Q. All right. If we could turn to PTX-1390 --	11:49:50
18	MR. HANNAH: And, Your Honor, this has been admitted	11:49:55
19	into evidence already.	11:49:57
20	THE COURT: All right.	11:50:09
21	BY MR. HANNAH:	11:50:09
22	Q. Go to Page 29 of this document.	11:50:13
23	MR. HANNAH: And, Your Honor, it shows the same	11:50:15
24	Bates number of 0029.	11:50:17
25	BY MR. HANNAH:	11:50:17

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1 Q. Doctor, can you, please, explain what's being shown on 11:50:26  
2 this slide with regard to the Catalyst switches. 11:50:29

3 A. Sure. So you can see here it says -- like the parts 11:50:33  
4 where it says, "UADP ASIC," we've talked about that before. 11:50:38  
5 UADP is the Unified Access Data Plane. That's the integrated 11:50:46  
6 circuit -- application-specific integrated circuit that's 11:50:54  
7 designed to do specifically the sort of dealing with the 11:50:58  
8 packets, matching the packets and so on. 11:51:01

9 I should point out in this picture you can see -- 11:51:07  
10 this is something I talked about before -- there are actually 11:51:09  
11 multiples of these UADP ASICs. Here there's a 0 and a 1, so 11:51:12  
12 there's two of them, right? So this is -- when we were 11:51:20  
13 talking about multiple processors, this is an example of 11:51:23  
14 multiple processors. 11:51:26

15 You also see on the right it talks about a quad core 11:51:28  
16 CPU. Those are the central processing units that are also 11:51:32  
17 doing the management. That's also, you know, additional, 11:51:36  
18 more processors. 11:51:41

19 But the key thing here, right, is that you have, you 11:51:43  
20 know, up at the top these ASIC packet buffers. And so these 11:51:48  
21 are buffers. Buffer is a memory, right? It's a holding 11:51:54  
22 place for information. And what you've got are these packet 11:51:59  
23 buffers that are going to hold the data while you're doing 11:52:05  
24 the swap-over, right? So there's memory there specifically 11:52:10  
25 to deal with the issue -- or to deal with these issues, 11:52:16

Mitzenmacher, M. - Direct

1 where, you know, you may have this sort of changeover and so 11:52:20  
2 you need to hold packets while you are waiting and swapping 11:52:24  
3 these rules. 11:52:29

4 THE COURT: Stop and cache. 11:52:33

5 THE WITNESS: Cease and cache, yes. 11:52:38

6 THE COURT: "Cease and cache" is the way you put it. 11:52:45

7 THE WITNESS: Absolutely. 11:52:47

8 THE COURT: Okay. 11:52:50

9 BY MR. HANNAH: 11:52:50

10 Q. And, Doctor, as a follow-up on the conversation we had 11:52:50  
11 before the break, would both of these processors being shown 11:52:52  
12 here be implementing the same rule sets? 11:52:56

13 A. Yes. 11:53:01

14 Q. And this is for bandwidth purposes, or to be able to 11:53:02  
15 process more packets? 11:53:06

16 A. Yes, that's what I assume it's for. They've chosen this 11:53:07  
17 design to maximize how they can -- maximize their speed 11:53:12  
18 efficiency tradeoff. 11:53:15

19 MR. HANNAH: All right. Your Honor, we'll turn to 11:53:33  
20 the next document. 11:53:38

21 BY MR. HANNAH: 11:53:38

22 Q. So turning to the next document, we have PTX-1313. 11:53:39

23 MR. HANNAH: Your Honor, this document, as well, has 11:53:44  
24 already been admitted into evidence. 11:53:47

25 THE COURT: Okay. 11:54:05

Mitzenmacher, M. - Direct

1 BY MR. HANNAH:

11:54:06

2 Q. If we go to Page 62 of this document, can you please --

11:54:07

3 Doctor, can you please explain what is being shown here? And

11:54:15

4 this is for the Aggregated Services Router, which is the

11:54:20

5 "ASR" that we've been referring to.

11:54:26

6 A. Right. So this is showing, maybe with a bit less detail,

11:54:28

7 you know, a pictorial version for the -- now it's the routers

11:54:35

8 that have the same sort of framework. So over on the left

11:54:39

9 you can see that it references the TCAM. That's up on the

11:54:47

10 left corner there. The ternary content-addressable memory,

11:54:53

11 that's like what's going to be holding the rules.

11:54:59

12 You can see over on the right the quad core CPU.

11:55:01

13 That's one of the processing units for managing the rules.

11:55:06

14 You can see, again, over on the left it has the various PPEs.

11:55:11

15 I believe this is referring to the processor elements. So

11:55:24

16 this is, again, the sort of multiple processors internally

11:55:30

17 that would be handling the various packets for the matching.

11:55:34

18 And, in particular, below you see the packet buffer,

11:55:41

19 the dispatcher packet buffer, and, again, these systems have

11:55:45

20 packet buffers to manage, you know -- to manage, to make sure

11:55:49

21 that you can perform this ceasing of processing without

11:55:55

22 losing the packets while you do the swap.

11:55:59

23 THE COURT: Well, does this function come before or

11:56:03

24 after the last one we looked at?

11:56:07

25 THE WITNESS: Oh, so the last one, I think, was --

11:56:11

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1 if I remember the document, I think that was for switches. 11:56:13  
2 I'm just showing that this applies equally well to routers. 11:56:17  
3 It has the same sort of setup. It's not really before or 11:56:22  
4 after, it's just the different products. 11:56:29

5 THE COURT: Well, why do you have to have a switch 11:56:31  
6 and a router perform the same function? 11:56:37

7 THE WITNESS: They do. They have slightly different 11:56:39  
8 hardware, so the diagrams are a bit different, but they 11:56:44  
9 perform exactly the same function. 11:56:47

10 THE COURT: Well, can you use either one of them, or 11:56:51  
11 do you have to use both? 11:56:54

12 THE WITNESS: Well, so switches are typically used, 11:56:55  
13 again, to sort of connect machines, you know, inside the same 11:57:00  
14 organization, and routers are used -- they can be a bit more 11:57:06  
15 powerful. They handle things that can be between 11:57:11  
16 organizations, so they -- those have the same effect of 11:57:15  
17 applying rules and rule sets, particularly for security, but 11:57:20  
18 they sort of function at different layers of where you're 11:57:25  
19 sending packets around. 11:57:31

20 THE COURT: I just don't understand. If the switch 11:57:34  
21 can cease and cache, why does the router perform the same 11:57:40  
22 function? Do they both perform this function on the same 11:57:49  
23 packet? 11:57:57

24 THE WITNESS: Well, when you send out the rules, you 11:57:58  
25 may conceivably have the same set of rules on both the 11:58:05



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1 switches and the routers, and that's because you don't 11:58:12  
2 necessarily know what path the packets will take. And so 11:58:15  
3 sometimes there may be some redundancy, that you're applying 11:58:19  
4 the same rule in multiple places, but, again, the reason for 11:58:22  
5 this is because you don't necessarily know ahead of time 11:58:29  
6 which path the packet will take through the network. 11:58:32

7 THE COURT: So what you're saying is that a 11:58:36  
8 particular packet may go through either a switch or a router 11:58:38  
9 or both. 11:58:48

10 THE WITNESS: Exactly. They may go through multiple 11:58:48  
11 things on the path. And, also, you may also set it up so 11:58:51  
12 that the routers and switches have different rules and 11:58:55  
13 different rule sets. But even if they had different rule 11:58:57  
14 sets, they would still go through the same process for 11:58:59  
15 updating rules. It might be just that once in a while you 11:59:06  
16 update the router rules, once in a while you update the 11:59:09  
17 switch rules, and they have different rules, but you still 11:59:12  
18 update both of the rule sets the same way. 11:59:16

19 BY MR. HANNAH: 11:59:19

20 Q. And, Doctor, isn't it possible for a customer to buy a 11:59:22  
21 Cisco switch and not buy a Cisco router and place that in 11:59:25  
22 their network? 11:59:29

23 A. Actually, I'd have to check. You want to have the switch 11:59:30  
24 and the router in most general networks because you want 11:59:35  
25 something internal and something external. I imagine you 11:59:40

Mitzenmacher, M. - Direct

1 might be able to buy a Cisco switch and use another person's 11:59:44  
2 router. I'd have to check with the Cisco people. But, 11:59:48  
3 generally, you buy switches and routers together and from the 11:59:50  
4 same vendor to make sure that they work together. 11:59:54

5 Q. And, also, I believe yesterday you discussed this 11:59:56  
6 different layered security. Can you discuss how that would 11:59:58  
7 apply, why you would want to have this redundancy that you 12:00:02  
8 talked about? 12:00:06

9 A. Yeah. So the switches are primarily utilized as security 12:00:06  
10 for, again, sort of the same organization. So this is at the 12:00:12  
11 layer 2 level, so that was that document, the seven layers, 12:00:18  
12 and this would be for -- a switch generally moves packets 12:00:25  
13 around inside an organization, and the router -- if you 12:00:31  
14 remember the big picture of the Internet and the packets 12:00:34  
15 crossing the country, routers can pass things from larger hop 12:00:36  
16 to larger hop around the country through multiple networks. 12:00:41

17 THE COURT: Okay. 12:00:54

18 BY MR. HANNAH: 12:00:55

19 Q. Doctor, there's an acronym there. It says QFP on this 12:00:56  
20 diagram. Can you explain what that is? 12:01:02

21 A. That is the Quantum Flow Processor. That's the name that 12:01:05  
22 they give this larger collection of processing elements and 12:01:09  
23 so on inside the routers. So if we see reference to "Quantum 12:01:17  
24 Flow" later, that's what the QFP refers to. 12:01:24

25 Q. And is it your understanding that these types of 12:01:29

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1	processors and this diagram applies to the ASR and the ISR	12:01:32
2	routers?	12:01:36
3	A. Yes. Again, they function similarly, or they perform the	12:01:37
4	same function with regard to this infringement.	12:01:40
5	Q. Doctor, I'd like to show you a deposition slide. This is	12:01:43
6	of Martin Hughes.	12:01:50
7	MR. HANNAH: And in your binder, Your Honor, this is	12:01:54
8	PTX-1917.	12:01:57
9	Martin Hughes, he's a Cisco software development	12:02:00
10	manager. This is from his deposition of December 17th, 2019,	12:02:05
11	and the citation is on Page 26, lines 13 through 22.	12:02:12
12	Your Honor, we would like permission to move	12:02:27
13	PTX-1917 into evidence, please.	12:02:29
14	THE COURT: All right. PTX-1917 will be admitted.	12:02:43
15	(Plaintiff's Exhibit PTX-1917 was received in	12:02:49
16	evidence.)	12:02:48
17	MR. HANNAH: Thank you, Your Honor.	12:02:48
18	BY MR. HANNAH:	12:02:50
19	Q. Doctor, looking at this testimony, can you explain how	12:02:50
20	this informs your opinion?	12:02:53
21	A. Again, the point is you need to have the packets saved	12:02:54
22	while this processing switch occurs, while you're switching	12:03:02
23	the rules, and this testimony verifies that the router	12:03:06
24	product have a buffer and will store the packets in the	12:03:13
25	buffer while they're awaiting for processing. So, in	12:03:18

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1 particular, while you're doing the rule switch, there's a 12:03:23  
2 buffer where those packets will wait. 12:03:27

3 THE COURT: Well, you call it a buffer and a router 12:03:31  
4 and a cache and a switch? 12:03:35

5 THE WITNESS: That's a good question. Actually, I 12:03:41  
6 believe I was even asked about this in deposition. 12:03:44

7 So both "cache" and "buffer" are ways that are used 12:03:47  
8 by computer scientists to talk about -- they're terms that 12:03:53  
9 really just mean memory. A cache is usually meant for 12:03:57  
10 something that you expect that you may need again in sort of 12:04:03  
11 the immediate future, and a buffer generally refers to 12:04:07  
12 something that you, you know, leave data waiting for a short 12:04:13  
13 period of time, until you're ready for it. 12:04:19

14 And, you know, sometimes you'll even hear the term 12:04:23  
15 "cache/buffer" or "buffer/cache," because, you know, they're 12:04:26  
16 both really, at the end of it, referring to memory. There's 12:04:31  
17 slightly different ways of -- it has different connotations 12:04:38  
18 to people, depending on the setting, but they both refer to 12:04:43  
19 memory. 12:04:47

20 They're both really applicable here. This is meant 12:04:47  
21 to a buffer, meant to hold or store the packet until the rule 12:04:50  
22 changes -- the rule set changes. And the patent calls it a 12:04:54  
23 "cache." Really, they're both just saying memory to hold the 12:05:00  
24 packets for a period of time while we're doing the switching 12:05:03  
25 of the rules. 12:05:05

Mitzenmacher, M. - Direct

1 THE COURT: Okay. 12:05:07

2 BY MR. HANNAH: 12:05:10

3 Q. All right. If we turn back to the claims, Doctor, do the 12:05:11  
4 Catalyst switches and the ASR and ISR routers -- do they meet 12:05:18  
5 the cease and cache elements of claims 9 and 17? 12:05:23

6 A. Yes, they do. 12:05:26

7 Q. Can we check those boxes? 12:05:28

8 A. Please do. 12:05:34

9 Q. Turning to the next elements, can you explain to the 12:05:35  
10 Court why you've grouped these elements and what they 12:05:45  
11 require? 12:05:48

12 A. So, just as before, when we were talking about grouping 12:05:48  
13 the sub-elements or the elements together that all dealt with 12:05:54  
14 the first rule set, we're doing the same thing here. 12:05:59

15 So, naturally, what happens when you switch to a 12:06:03  
16 second rule set, as described here, put together, you 12:06:07  
17 reconfigure things to work with the second rule set, you 12:06:12  
18 signal completion so that it's known that you're switching 12:06:17  
19 over to the second rule set, and then once it's -- you know, 12:06:21  
20 once you've had success, once you've determined that it's 12:06:26  
21 time to switch to the second rule set, you start processing 12:06:28  
22 packets with the second rule set. 12:06:32

23 Q. All right. If we can turn to PTX-1303. 12:06:34

24 MR. HANNAH: And PTX-1303 has been admitted into 12:06:46  
25 evidence. 12:06:49

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1 THE COURT: All right. 12:07:09

2 MR. HANNAH: And, Your Honor, I'd like to turn your 12:07:11  
3 attention to... 12:07:13

4 BY MR. HANNAH: 12:07:13

5 Q. And, Doctor, your attention to Page 73 of this document, 12:07:14  
6 which has the corresponding Bates number of 73, 0073. 12:07:19

7 Doctor, can you, please, explain what's being shown 12:07:29  
8 on this slide and how it informs your opinion. 12:07:32

9 A. So this is talking about the Catalyst 9500 series, and 12:07:35  
10 this is, you know, again, it's part of the Cisco Live, so 12:07:39  
11 this is just part of a talk they would be giving to their 12:07:46  
12 customers. And so it's perhaps a bit of marketing, but I 12:07:50  
13 think it gives a brief description of what's going on. In 12:07:57  
14 particular, as it says, allows update to an ACL -- remember, 12:08:01  
15 an ACL is just the Access Control List, a collection of 12:08:05  
16 rules -- without interrupting traffic. 12:08:10

17 So it's saying that this is a feature they're 12:08:13  
18 bringing out that will, you know, improve performance by 12:08:16  
19 allowing updates, without interrupting the traffic. 12:08:21

20 BY MR. HANNAH: 12:08:24

21 Q. And also, we see that red dot that says that it's 12:08:25  
22 starting in 16.8.1. Do you see that? 12:08:27

23 A. Yes. 12:08:34

24 Q. Doctor, I'd like to turn your attention back to 1195 -- 12:08:37

25 THE COURT: What was that 16? What did you -- 12:08:43

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1 MR. HANNAH: 16.8.1. 12:08:47

2 BY MR. HANNAH: 12:08:51

3 Q. Doctor, can you explain what that means? 12:08:51

4 A. Sure. So remember we were talking about the operating 12:08:53

5 system, and we spoke about IOS 16, in particular, starting 12:08:57

6 with 16. I believe this is referring to one of the versions 12:09:10

7 of the operating system; namely, 16.8.1. So that, I believe, 12:09:19

8 is referring to the Cisco operating system. 12:09:28

9 MR. HANNAH: Were you able to catch that, Your 12:09:43

10 Honor, because we had some audio -- 12:09:45

11 THE COURT: (Nodding.) 12:09:45

12 MR. HANNAH: Okay. 12:09:47

13 BY MR. HANNAH: 12:09:47

14 Q. All right, Doctor. I'd like to turn your attention to 12:09:49

15 PTX-1195. 12:09:52

16 MR. HANNAH: Again, this has already been admitted 12:09:53

17 into evidence. 12:09:56

18 BY MR. HANNAH: 12:09:56

19 Q. I'd like to turn your attention back to Page 4 of this 12:10:02

20 document. 12:10:04

21 MR. HANNAH: Again, this ends in PTX-004, for the 12:10:05

22 Bates number. 12:10:11

23 THE COURT: Just a moment. 12:10:12

24 BY MR. HANNAH: 12:10:12

25 Q. In terms of the sequence of events, can you tell us, 12:10:16

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1 where are we in the sequence of events and how it maps to the 12:10:19  
2 claim elements? 12:10:22

3 A. Right. So we're down towards the bottom, and the 12:10:24  
4 reconfiguring would be like adding the new TCAM entries and 12:10:27  
5 deleting the old TCAM entries and then success -- the 12:10:37  
6 returning success would be, you know, so the signal -- or 12:10:40  
7 begin the signaling that you're ready to move on to the 12:10:42  
8 second rule set and start processing packets in the second 12:10:45  
9 rule set. 12:10:49

10 Q. And if we turn to PTX-1288, which has already been 12:10:57  
11 admitted into evidence, can you -- and if we turn to 12:11:04  
12 Page 12 -- 12:11:14

13 MR. HANNAH: Again, this ends in Bates label 0012. 12:11:15  
14 It has the same corresponding Bates number. 12:11:20

15 THE COURT: Just a moment, now. I'm looking for 12:11:22  
16 that exhibit. It's 11 what? 12:11:24

17 BY MR. HANNAH: 12:11:28

18 Q. Can you explain how this diagram pertains to these 12:11:29  
19 elements of the claim? 12:11:33

20 A. Sure. The Judge actually asked about this before. He 12:11:34  
21 said -- you know, he was asking, oh, well, does it, like -- 12:11:37  
22 is this for the first rule set or for the second rule set? 12:11:41

23 And the idea is this diagram applies for both the 12:11:45  
24 first rule set and the second rule set. It's just saying 12:11:50  
25 that when you have a rule set, this is what the processing 12:11:53



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1 according to the rules looks like's. The various ACLs are 12:11:56  
2 the rules. They can be denied or eventually forwarded based 12:12:00  
3 on those rules. 12:12:05

4 And, in particular, what changes isn't the way that 12:12:07  
5 it processes the rules. What changes is the rule set. So 12:12:13  
6 you're not changing, like, how you apply the rules, you're 12:12:17  
7 just changing what the rules are. 12:12:21

8 So this document -- or this figure applies to both 12:12:22  
9 the first rule set and the second rule set. 12:12:25

10 MR. HANNAH: And, Your Honor, I'm not sure if it's 12:12:30  
11 on purpose or not, but it indicates that you're on mute. 12:12:31

12 THE COURT: I'm sorry? 12:12:36

13 (There was a pause in the proceedings.) 12:12:53

14 THE COURT: All right. What exhibit is that diagram 12:12:56  
15 in? 12:13:03

16 MR. HANNAH: Yes. This is PTX-1288, and it's on 12:13:03  
17 Page 12, which has the same corresponding Bates label, 0012. 12:13:10

18 THE COURT: 1288, Page 8? 12:13:16

19 MR. HANNAH: Page 12. 12:13:20

20 THE COURT: Okay. That's where I was on mute. Go 12:13:36  
21 ahead. 12:13:43

22 MR. HANNAH: Thank you, Your Honor. 12:13:44

23 BY MR. HANNAH: 12:13:45

24 Q. I'd like to turn your attention back to PTX-1915, which 12:13:47  
25 is the deposition testimony of Peter Jones. 12:13:53

-Mitzenmacher, M. - Direct-

1	And, Doctor, can you explain, in terms of his	12:13:58
2	testimony, what are we talking about with the second rule set	12:14:04
3	and how the system is configured to process packets at the	12:14:09
4	second rule set?	12:14:13

5	A. This testimony confirms my opinion that he's talking	12:14:13
6	about you switch from a first rule set, rule set A, to a	12:14:21
7	second rule set, rule set B. And, at the end, you update	12:14:25
8	these rules, and because you're not dropping packets or	12:14:31
9	somehow avoiding -- having packets avoid the rules during	12:14:38
10	this transition, that also tells me that there's a signaling	12:14:41
11	process that says, hey, we stop with the first rule set;	12:14:46
12	we're starting to put in the second rule set. Then we put in	12:14:50
13	the second rule sets, and again we signal when we're ready to	12:14:53
14	process packets again.	12:14:58

15	MR. HANNAH: Your Honor, at this time we'd like	12:15:01
16	to -- we tried to group the source code sites together,	12:15:03
17	because we're at the end of the proofs for these elements,	12:15:08
18	for the switches and routers at least, and so we'd like to	12:15:11
19	seal the courtroom so we can discuss a couple pieces of	12:15:16
20	source code, please.	12:15:20

21	THE COURT: All right.	12:15:21
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22 (Confidential testimony from Page 634, Line 22,  
23 through Page 640, Line 5, was redacted.)

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Mitzenmacher, M. - Direct

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(Confidential testimony from Page 634, Line 22,  
through Page 640, Line 5, was redacted.)

5

\* \* \* \* \*

12:24:21

6

BY MR. HANNAH:

12:24:21

7

Q. Doctor, can you just give us a brief recap in terms of

12:24:22

8

how the Catalyst switches and ISR and ASR routers meet the

12:24:25

9

reconfigure signal completion and responsive to receiving the

12:24:29

10

signal elements of both claims 9 and 17?

12:24:34

11

A. As we've seen, you know, when it obtains a second rule

12:24:37

12

set, it will do a reconfiguration. It will say, okay, I'm

12:24:44

13

going to, as we've seen before, stop processing cache packets

12:24:48

14

while it waits, do this reconfiguration step. That involves,

12:24:53

15

as we've seen, moving new rule sets into the TCAM, validating

12:24:56

16

that it moved correctly, and once it's validated that it

12:25:01

17

moved correctly, it will signal, again through that status,

12:25:06

18

the completion of the reconfiguration process, to say that

12:25:12

19

it's ready to go with the second rule set.

12:25:15

20

And then, as we've seen, it will process packets

12:25:19

21

according to the second rule set, as we've seen in the

12:25:22

22

diagram about processing packets and elsewhere, of course.

12:25:26

23

Q. So, Doctor, can we check those boxes?

12:25:30

24

A. Yes, let's check all those three boxes together.

12:25:34

25

Q. All right, great. And before we move on to the firewall,

12:25:37

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1 I'd like to show you your recapped demonstrative for the 12:25:41  
2 switches and the routers. 12:25:53

3 And, Doctor, can you just give us a brief recap in 12:25:57  
4 terms of how the switches and routers meet all of the 12:26:01  
5 elements of claims 9 and 17 of the '806 patent? 12:26:04

6 A. Certainly. So the Digital Network Architecture and the 12:26:11  
7 Catalyst switches that -- the Digital Network Architecture, 12:26:15  
8 which is used to manage, control, and provide rule sets to 12:26:19  
9 the Catalyst switches and the various routers, are a system 12:26:25  
10 that provide network security. And, as I've also described, 12:26:26  
11 they contain code, they contain computer-readable 12:26:30  
12 instructions to perform all the steps that I have described. 12:26:35

13 They receive information from outside sources, such 12:26:38  
14 as Talos, Stealthwatch, and third parties and use them, 12:26:43  
15 preprocess them, to create the -- take the information, these 12:26:50  
16 rules, and use them to distribute to the switches and 12:26:55  
17 routers, and that involves preprocessing for optimization. 12:26:59

18 The switches and routers use a first rule set until 12:27:03  
19 an update arrives, and when the update arrives, then they use 12:27:08  
20 this update operation to perform the swap, as mentioned, 12:27:13  
21 without dropping any packets using the cache -- and, again, 12:27:17  
22 it's a packet buffer or cache -- and after the rule set is 12:27:21  
23 swapped, then you begin processing with the second rule set, 12:27:29  
24 as according to the claim. 12:27:32

25 MR. HANNAH: Your Honor, if you don't have any 12:27:36

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1 questions, then we can move on to the firewall products. 12:27:38

2 THE COURT: All right. 12:27:42

3 BY MR. HANNAH: 12:27:42

4 Q. So let's take a look at the firewall products. 12:27:45

5 If we go back to the claims and uncheck all the 12:27:51  
6 boxes, if we look at the first element of both claim 9 and 12:27:55  
7 17, do the firewall products, which are the firewall -- the 12:28:03  
8 Firepower, as well as the Adaptive Security Appliance, are 12:28:09  
9 they -- do they contain a system with the plurality of 12:28:13  
10 processors and memory comprising instructions, as recited in 12:28:17  
11 claim 9? 12:28:21

12 A. Yes, they do. 12:28:22

13 Q. And just as a reminder from yesterday, in terms of for 12:28:26  
14 purposes of infringement, does the Firepower firewall and the 12:28:31  
15 ASA, or the Adaptive Security Appliance, do they work in the 12:28:35  
16 same way? 12:28:38

17 A. Yes, they do. 12:28:41

18 Q. And so we can take those together, as we discussed, and 12:28:43  
19 just refer to them as firewalls? 12:28:47

20 A. We can take those together. 12:28:49

21 THE COURT: What are you calling it? Adaptive 12:28:51  
22 Security what? 12:28:55

23 THE WITNESS: Appliance, Your Honor. 12:28:55

24 THE COURT: Okay. 12:29:09

25 BY MR. HANNAH: 12:29:11

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1 Q. And just so the record is clear, Dr. Mitzenmacher, is it 12:29:13  
2 okay if we refer to both the firewall, the Firepower 12:29:19  
3 firewall, and the Adaptive Security Appliance as the 12:29:23  
4 firewalls? 12:29:26

5 A. Yes, that would be helpful. 12:29:26

6 Q. All right. And do the firewalls -- do they work together 12:29:27  
7 with the Firepower Management Center? 12:29:32

8 A. Yes, they do. The Firepower Management Center is a 12:29:34  
9 controller management center that allows you to handle 12:29:38  
10 multiple firewalls at the same time. 12:29:42

11 Q. All right. So let's turn to PTX-244. 12:29:43

12 Doctor, can you explain what the PTX-244 is? 12:29:52

13 A. This is a data sheet, so this would be public information 12:29:55  
14 about describing the Cisco Firepower Management Center. 12:29:59

15 MR. HANNAH: Your Honor, we'd like to move PTX-244 12:30:03  
16 into evidence, please. 12:30:07

17 MR. GAUDET: No objection. 12:30:08

18 THE COURT: Okay. PTX-244, that's the Firepower 12:30:12  
19 Management Center, will be admitted. 12:30:54

20 (Plaintiff's Exhibit PTX-244 was received in 12:30:56  
21 evidence.) 12:30:57

22 MR. HANNAH: Thank you, Your Honor. 12:30:57

23 BY MR. HANNAH: 12:30:58

24 Q. So if we go to Page 9 of this document, which ends in 12:30:58  
25 Bates number 937, if we look in the table where it has 12:31:04

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1	"memory" and then it talks about the CPUs, can you explain	12:31:17
2	what's being shown here and whether the Firepower Management	12:31:22
3	Center contains a processor and memory?	12:31:27
4	A. Yes. So this just shows that it contains a -- there's a	12:31:29
5	processor and memory, the computer-readable instructions, and	12:31:35
6	also the CPUs are -- some of them specifically contain more	12:31:41
7	than two processors. Even the one that contains one	12:31:48
8	processor, the Xeon 4110, is a multicore processor, so it	12:31:51
9	would contain multiple processing units on the single chip.	12:31:59
10	Q. And if we go to PTX-1277, can you explain what is being	12:32:04
11	shown here, Doctor?	12:32:17
12	A. This is an overview document describing the architecture	12:32:18
13	of the ASA, the ASA version of the firewall product.	12:32:26
14	MR. HANNAH: All right. Your Honor, at this time	12:32:33
15	we'd like to move PTX-1277 into evidence.	12:32:34
16	MR. GAUDET: No objection.	12:32:37
17	THE COURT: ASA means Adaptive Security Appliance?	12:32:43
18	THE WITNESS: Yes.	12:32:53
19	THE COURT: That will be admitted.	12:33:07
20	(Plaintiff's Exhibit PTX-1277 was received in	12:33:09
21	evidence.)	12:33:09
22	MR. HANNAH: Thank you, Your Honor.	12:33:09
23	BY MR. HANNAH:	12:33:11
24	Q. Doctor, maybe it will be helpful to explain the relation	12:33:11
25	between ASA and then the later generation of Firepower	12:33:15

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1 firewalls. What is that relationship? 12:33:20

2 A. So ASA was, like I said, a previously -- or a branded 12:33:22  
3 product, but the ASA code base was sort of moved in or 12:33:32  
4 incorporated, so they share the same, I'd say, functionality 12:33:36  
5 and in some cases the same code, and this was described in 12:33:44  
6 various places, both in their documentation and in testimony 12:33:47  
7 from Cisco engineers. 12:33:52

8 Q. So when we look at ASA documents and source codes, does 12:33:54  
9 that apply equally to the Firepower firewalls? 12:34:00

10 A. Yeah. We'll be using -- you know, they share the same 12:34:03  
11 functionality and may include the same source codes, yes. 12:34:07

12 Q. If we go to Page 7 of this document, this block diagram, 12:34:12  
13 can you explain how this informed your opinion as to whether 12:34:23  
14 the firewalls contain plurality of processors and memory 12:34:26  
15 comprising instructions? 12:34:32

16 A. Sure. So it's a bit hard to see, but up in the top 12:34:34  
17 middle, you can see it says, in the blue there underneath, 12:34:38  
18 CPU. You can see there the multiple CPUs, and, as I said 12:34:45  
19 before, the CPUs themselves actually have multiple cores, and 12:34:50  
20 there's various memory, including memory for storing the sort 12:34:57  
21 of instructions to make this all work. That would include 12:35:01  
22 the flash -- flashes, referring to a flash memory, which is 12:35:04  
23 typically used to store instructions. Similarly, there's 12:35:11  
24 also a Random Access Memory up above, labeled "RAM." 12:35:13

25 MR. HANNAH: Your Honor, if we could go to Page -- 12:35:33



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1           THE COURT: I don't follow this diagram. What is 12:35:37  
2 this supposed to illustrate? 12:35:40

3           THE WITNESS: All we're doing is, you know, I think, 12:35:42  
4 providing something which I don't think is really under 12:35:46  
5 debate, but, you know, covering all our bases, is just that 12:35:50  
6 these devices have memory for storing instructions, and they 12:35:55  
7 have processing elements, you know, processors. 12:36:04

8           THE COURT: Memory plus multiple processors? 12:36:08

9           THE WITNESS: Yeah. 12:36:19

10          THE COURT: And this is the software architecture 12:36:21  
11 we're looking at? 12:36:24

12          THE WITNESS: Well, it's a software architecture 12:36:25  
13 document, but this is a basic picture of the hardware setup, 12:36:28  
14 and you can see that because it's showing connections between 12:36:34  
15 memory and various subcomponents. Like, there's a crypto 12:36:38  
16 accelerator. So that would be, again, a component on the 12:36:45  
17 device -- the input/output bridge. It's a very rudimentary 12:36:50  
18 hardware diagram, and again, all we wanted to show was that 12:36:58  
19 it had memory and processors. 12:37:01

20          THE COURT: Okay. 12:37:16

21 BY MR. HANNAH: 12:37:21

22 Q. All right. If we could go back to the claims. 12:37:21

23          Doctor, based on the documents and testimony that 12:37:23  
24 you've reviewed, are the firewalls a system that comprise a 12:37:32  
25 plurality of processors and memory comprising instructions 12:37:39

Mitzenmacher, M. - Direct

1 that when executed cause the processor to do some actions? 12:37:41

2 A. Yes. Claim 9 -- yes. 12:37:47

3 And I guess we can move on to claim 17, where, 12:37:56  
4 similarly, there's non-transitory computer-readable media 12:37:59  
5 comprising these instructions that, when executed by a 12:38:02  
6 computer system, cause it to -- again, one is the system 12:38:04  
7 itself, and one is the sort of code or instructions behind 12:38:11  
8 the system. 12:38:13

9 Q. So, based on that, can we check the box for both claims 9 12:38:14  
10 and 17 for the firewalls? 12:38:21

11 A. Yes. 12:38:23

12 Q. All right. Let's move on to the first common element 12:38:24  
13 between claim 9 and 17, which is the receiving of a first 12:38:37  
14 rule set and a second rule set. 12:38:41

15 Can you explain what is being -- what is being 12:38:44  
16 referenced here or remind us what is being referenced here? 12:38:46

17 A. So firewalls, like the switches and routers, will receive 12:38:51  
18 sets of rules, and rules have to be changed or modified or 12:38:54  
19 updated to deal with new situations, and the idea of these 12:38:59  
20 rule sets is obviously to provide security by examining and 12:39:04  
21 potentially dropping packets. 12:39:10

22 Q. If we look at your -- 12:39:12

23 THE COURT: Is this just redundancy here? I mean, 12:39:14  
24 why do we need a firewall if we have multiple switches and 12:39:21  
25 routers providing security? Why do we also need a firewall? 12:39:28

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1           THE WITNESS: So part of it is this multilayer, 12:39:31  
2 right; that you want to have different layers of security, so 12:39:38  
3 if anything gets through one layer, it can possibly be 12:39:41  
4 stopped by another layer. 12:39:44

5           And the other thing is that firewalls, because 12:39:46  
6 they're really -- their sort of main purpose, design, is 12:39:53  
7 simply to examine packets and to potentially drop them; that 12:40:00  
8 they can handle, potentially, more complex or sophisticated 12:40:03  
9 rules than you might want to put in the routers and switches, 12:40:08  
10 you know, for efficiency reasons. 12:40:13

11           THE COURT: Oh, so they can have a different set of 12:40:17  
12 rules because they're on a different operating system? 12:40:22

13           THE WITNESS: Yeah. They might have -- 12:40:24

14           THE COURT: Is that why they can have a separate set 12:40:27  
15 of rules, because they're operating systems are different? 12:40:30

16           THE WITNESS: Their operating systems are different, 12:40:33  
17 so I think that part of that means that they're set up to 12:40:38  
18 handle different types of rules, as well. 12:40:42

19           THE COURT: Okay. 12:40:50

20 BY MR. HANNAH: 12:40:53

21 Q. So, Doctor, if we could go to the next slide, which shows 12:40:54  
22 the architecture, and can you just explain what is being 12:40:57  
23 shown here? 12:41:00

24 A. So similarly here, the Firepower and the Firepower 12:41:01  
25 systems, the management center will receive various threat 12:41:09

Mitzenmacher, M. - Direct

1 intelligence or receive information that contain rules that 12:41:14  
2 suggest updates that may -- you may want to apply to the 12:41:21  
3 individual Firepower. So using the rules and the context 12:41:25  
4 given by the threat intelligence, you may want to do some 12:41:31  
5 updates. 12:41:34

6 Q. And yesterday we heard how Cisco described it, and 12:41:35  
7 Dr. Moore, as operationalizing threat intelligence. Do you 12:41:44  
8 remember that? 12:41:49

9 A. Yes, "operationalizing threat intelligence" or 12:41:49  
10 "operationalizing cyber threat intelligence," sometimes is 12:41:53  
11 used. 12:41:55

12 Q. If we go to PTX-1291, Doctor, can you, please, explain 12:41:58  
13 what this document is? 12:42:08

14 A. So this is a document describing Version 6.2.2 of the 12:42:09  
15 Firepower. So this is -- remember, we were talking about -- 12:42:18  
16 for the routers and switches, we were talking about their 12:42:23  
17 operating system versions, and we were looking at numbers 12:42:27  
18 like 16.5. 12:42:32

19 So Firepower has its own releases and its own 12:42:33  
20 versions. They're separate sets of products, so it's 12:42:38  
21 numbered or behaves differently, and we're looking at, for 12:42:43  
22 the Firepower systems, the release notes for this version, 12:42:48  
23 6.2.2. 12:42:52

24 MR. HANNAH: Your Honor, at this point we'd like to 12:42:55  
25 move PTX-1291 into evidence, please. 12:42:56

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1 MR. GAUDET: No objection. 12:42:59

2 THE COURT: Well, is this a white paper? 12:43:08

3 THE WITNESS: These are release notes, so this will 12:43:30  
4 be describing -- 12:43:37

5 THE COURT: Is it the same thing as a white paper or 12:43:38  
6 what? 12:43:40

7 THE WITNESS: No. I think this is -- gets to a more 12:43:40  
8 technical level than a white paper and I think would be, you 12:43:44  
9 know, more primarily used for internal use. 12:43:48

10 THE COURT: In other words, this would not be 12:44:06  
11 something you necessarily send to your customers. 12:44:09

12 THE WITNESS: I would have to look inside to recall 12:44:13  
13 or to check. I can imagine that you might send this or part 12:44:17  
14 of this to customers in describing certain aspects of the 12:44:21  
15 system, but you might not make it public to, like, 12:44:25  
16 non-customers, because it will have more detailed 12:44:29  
17 information. 12:44:32

18 THE COURT: Okay. 12:44:34

19 (Plaintiff's Exhibit PTX-1291 was received in 12:44:34  
20 evidence.) 12:44:36

21 BY MR. HANNAH: 12:44:36

22 Q. Maybe to help, Doctor, what is the purpose of having 12:44:37  
23 release notes? 12:44:39

24 A. Often, it's to describe issues or changes, things that 12:44:40  
25 are new in the new version, like new features or new aspects 12:44:46

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1 or characteristics, in particular. It's to provide sort of a 12:44:53  
2 guide as to the functioning of the system. 12:44:58

3 Q. All right. Doctor, if we can move to Page 7 of this 12:45:08  
4 document, which ends in the same corresponding Bates label, 12:45:11  
5 007. 12:45:16

6 THE COURT: 007. 12:45:19

7 MR. HANNAH: 007, yeah. 12:45:20

8 MR. GAUDET: Shaken, not stirred. 12:45:27

9 THE WITNESS: Again -- 12:45:34

10 BY MR. HANNAH: 12:45:34

11 Q. Go ahead, Doctor. 12:45:34

12 A. So, again, I would think this might not be something you 12:45:34  
13 made generally available, but you can imagine you would want 12:45:40  
14 to give this to the customers just because it would describe 12:45:42  
15 like the new features and functionality, so that they would 12:45:45  
16 know and understand what the new version of the product was 12:45:48  
17 and how it compared to other versions. 12:45:51

18 Q. If we look at under the Cisco Threat Intelligence 12:45:54  
19 Director -- and it continues on to the next page. 12:46:01

20 Can you explain what this is showing, Doctor, and, 12:46:07  
21 in particular, how the Cisco Threat Intelligence Director 12:46:10  
22 operationalizes threat intelligence? 12:46:13

23 A. Right. So the Threat Intelligence Director is the unit 12:46:15  
24 or the part that is in the, I guess, Firepower Management 12:46:20  
25 Center, which deals with these threat intelligence coming 12:46:27

Mitzenmacher, M. - Direct

1 from additional sources. 12:46:31

2 As it says up at the top, "The Cisco Threat 12:46:33  
3 Intelligence Director operationalizes custom threat 12:46:40  
4 intelligence data, helping you aggregate additional 12:46:43  
5 intelligence data, configure defensive actions, and analyze 12:46:46  
6 threats in your environment." 12:46:51

7 So this is telling me that it's getting information 12:46:52  
8 from additional sources. It's using them -- when it says 12:46:54  
9 "configure defensive actions," that's to help set up new 12:46:59  
10 rules so that you can try and block the threats based on 12:47:03  
11 these additional sources of information. 12:47:08

12 So in the next line, it specifically says that it 12:47:12  
13 ingests threat intelligence from third-party threat feeds and 12:47:19  
14 from threat intelligence platforms, so it's getting 12:47:23  
15 information from additional sources. 12:47:27

16 Q. If we look at where it says, "By converting" -- 12:47:36

17 A. Right. If we look at the next paragraph, yeah, "By 12:47:40  
18 converting intelligence into actionable indicators of 12:47:45  
19 compromise, your network defenses can block or monitor more 12:47:51  
20 threats, reduce the number of alerts to review, and improve 12:47:55  
21 your overall security posture." 12:47:59

22 So it's taking these threat intelligence, these 12:48:03  
23 indicators, and using it to come up with new rules, right? 12:48:07  
24 Your network defenses can block or monitor more threats, so 12:48:12  
25 you'll be developing new rules to block additional potential 12:48:16

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1 threats, which corresponds to blocking packets from the 12:48:20  
2 firewall devices or potentially monitoring them, as well. 12:48:24

3 Q. And just to verify, Doctor, so the top of this paragraph 12:48:28  
4 shows that it was introduced into the firewalls in version 12:48:42  
5 6.2.2; is that right? 12:48:46

6 A. Yeah. It was introduced in this version. 12:48:47

7 MR. HANNAH: And, Your Honor, I believe I did this, 12:48:55  
8 but I just want to make sure that PTX-1291 has been moved 12:48:56  
9 into evidence. 12:49:00

10 THE COURT: Yes, it has been. 12:49:03

11 MR. HANNAH: Thank you, Your Honor. 12:49:06

12 BY MR. HANNAH: 12:49:09

13 Q. Doctor, I'd like to turn your attention to PTX-1289. 12:49:09

14 Doctor, can you explain what PTX-1289 is? 12:49:19

15 A. This is a similar document. This is talking about for 12:49:22  
16 the Firepower Management Center, but it's labeled as a 12:49:29  
17 configuration guide. 12:49:33

18 MR. HANNAH: Your Honor, we'd like to move PTX-1289 12:49:35  
19 into evidence, please. 12:49:39

20 THE COURT: Now, this is called "Configuration 12:49:58  
21 Guide." 12:50:02

22 THE WITNESS: I would assume that this, again, would 12:50:07  
23 be the information that you might provide a customer so that 12:50:10  
24 they would know better how to set up the device, once they 12:50:13  
25 received it. 12:50:16



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1 THE COURT: Well, this is the Threat Intelligence 12:50:23  
2 Director, which is a program, I guess, or a product. What 12:50:29  
3 would you call a Threat Intelligence Director? Just like 12:50:42  
4 what we've used as manager before? This directs threat 12:50:49  
5 intelligence. What is the difference between directing it 12:50:58  
6 and managing it? 12:51:00

7 THE WITNESS: I think the Threat Intelligence 12:51:01  
8 Director is that it feeds the Firepower Management Center, 12:51:06  
9 and then it's the director because it's getting information 12:51:13  
10 from potentially multiple sources and pulling it all together 12:51:15  
11 into the format for the Firepower Management Center. So I'd 12:51:20  
12 say it's a component of the Firepower Management Center or a 12:51:25  
13 program part of the Firepower Management Center, as we've 12:51:30  
14 seen in the previous document and -- 12:51:35

15 THE COURT: This would tell you where to send the 12:51:38  
16 intelligence that you gather? 12:51:43

17 THE WITNESS: I think it's just gathering it from 12:51:44  
18 multiple sources and then giving it to the rest of the 12:51:48  
19 Firepower Management Center. 12:51:53

20 THE COURT: Okay. 12:51:56

21 MR. HANNAH: And, Your Honor, I just want to confirm 12:51:58  
22 that PTX-1289 has been moved into evidence. 12:52:02

23 THE COURT: Yes. 12:52:05

24 (Plaintiff's Exhibit PTX-1289 was received in 12:52:09  
25 evidence.) 12:52:12

Mitzenmacher, M. - Direct

1 BY MR. HANNAH:

12:52:12

2 Q. If we could go to Page 1594 of this document.

12:52:12

3 If we look at the bottom diagram, it has -- before  
4 we get into the diagram, can you explain, what does "TID"  
5 stand for?

12:52:18

12:52:26

12:52:30

6 THE COURT: Threat Intelligence Director?

12:52:35

7 THE WITNESS: Yes, that's right. TID is Threat  
8 Intelligence Director.

12:52:43

12:52:48

9 BY MR. HANNAH:

12:52:48

10 Q. Can you explain, based on this diagram, how the process  
11 works?

12:52:49

12:52:52

12 A. As you can see from the diagram, the Threat Intelligence  
13 Director -- you can get a component or a piece or a part of  
14 the Threat Intelligence Director, and it's getting  
15 information from outside sources, right? So you can see that  
16 on the left. It's getting from various sorts of sources --  
17 TAXII was an acronym we talked about last time. It's one I  
18 never remember well, so I hope it's on your sheet. You can  
19 get lists of URLs, that's Uniform Resource Locators or web  
20 pages. You can upload directly.

12:52:52

12:52:56

12:52:59

12:53:03

12:53:07

12:53:16

12:53:22

12:53:28

12:53:33

21 And what comes in through these sources is threat  
22 intelligence, and these threat intelligence contain rules,  
23 right? And then what the Threat Intelligence Director does  
24 is essentially pull all those together, process them, and  
25 decides, you know, as part of the Firepower Management

12:53:36

12:53:39

12:53:42

12:53:47

12:53:52

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1 Center, whether it's going to update the managed devices over 12:53:59  
2 on the right, and here, where it says, "Element Manage 12:54:02  
3 Device," that's the firewall, right? You can see that it's 12:54:07  
4 connected up to the network traffic. These are the devices 12:54:10  
5 getting the network traffic. 12:54:13

6 So you can think of this as a path to -- there's 12:54:15  
7 threat intelligence coming from the left, right? It goes 12:54:20  
8 into the Firepower Management Center, into the Threat 12:54:23  
9 Intelligence Director, where it has to be operationalized. 12:54:28  
10 It has to be looked at, processed, and determined if that 12:54:31  
11 means that you want to update the rules over on the right for 12:54:35  
12 the managed devices, which are the firewalls. 12:54:39

13 And, again, you can see that when you have the 12:54:44  
14 corresponding incidents, it says there on the bottom, when it 12:54:51  
15 passes that information, right, onto the elements, then you 12:54:57  
16 can take various configured actions, that is, the outcome of 12:55:02  
17 the rules. You can decide to monitor, block, partially 12:55:07  
18 block, or no action. So you can update your rules to do 12:55:11  
19 things like block, depending on the information you've 12:55:17  
20 received. 12:55:22

21 MR. HANNAH: All right. Your Honor, I'd like to 12:55:34  
22 show the Doctor some source code. I'm not sure if you want 12:55:36  
23 to dive into that right now or if you would like to go ahead 12:55:41  
24 and take lunch, since we've got about five minutes. 12:55:46

25 THE COURT: Why don't we take our luncheon recess, 12:55:49

—Mitzenmacher, M. - Direct—

1 and we'll return at 2:00.

12:55:56

2 MR. HANNAH: Thank you, Your Honor.

12:55:58

3 (The proceedings recessed at 12:56 p.m.)

12:56:01

4  
5 CERTIFICATION

6  
7 I certify that the foregoing is a correct transcript  
8 from the record of proceedings in the above-entitled matter.  
9

10  
11 \_\_\_\_\_/s/\_\_\_\_\_

12 Carol L. Naughton

13 May 12, 2020  
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Carol L. Naughton, Official Court Reporter